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Youth Engagement in Artisanal and Small-scale Mining in the Upper East Region of Ghana

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Abstract

Youth unemployment remains a prevalent problem in sub-Saharan Africa and many of its governments are grappling with it. Artisanal and small-scale mining (ASM), however, is gaining prominence in generating employment avenues for the youth. In fact, ASM provides jobs for thousands of youth and is considered to be ameliorating hardships in many rural areas. ASM has therefore been broadly acknowledged as a 'poverty-driven' activity. Given the sector's contribution (both legally and illegally) to rural livelihoods, governments and development partners interested in poverty reduction are uncertain of how to deal with the growth of ASM. Policymakers and development partners seem confused about the place of ASM on their development agenda, and question ASM's viability as a long-term youth employment avenue. Furthermore, the destructive nature of ASM raises questions about its impact on environmental sustainability. This research, conducted in the Upper East Region of Ghana, contributes to the discussions on ASM by investigating what is pushing an ever-increasing number of youth into the sector. Theoretically, this thesis is grounded in rural livelihoods studies, health geography and risk perception. Qualitative methods consisting of semi-structured interviews (n=70) and focus group discussions (n=5) with youth and key informants were employed in this research.

The findings of the research suggest that besides geographical proximity to minerals, extreme poverty experienced at community, household and individual levels is the most important motivating factor for youth participation in ASM. Youth's awareness of the occupational risks of ASM does not translate into appropriate workplace safety behaviors. The perceived benefits of ASM seem to outweigh the cost of associated health risks or environmental damage as a result of their activities.

These findings provide some relevant policy options for the government and all stakeholders. First, policies which promote income generating opportunities for youth besides agriculture and ASM should be exploited. Second, in designing employment programs, youth opinions and interests should be considered in order to attract them to the alternative employment sectors. Finally, given that poverty is pervasive in the research area, a holistic approach to poverty reduction is needed.

Key words: artisanal and small-scale mining, youth, rural livelihoods, risk perception, environment, Ghana

Dedication

To my children, and the best duo - Maisy and Blaise

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List of Abbreviations

ADLI	Agricultural Development Led Industrialisation
AL	Alternative Livelihoods
ASM	Artisanal and Small-scale Mining
DCE	District Chief Executive
DFID	Department for International Development
EPA	Environmental Protection Agency
FGD	Focus Group Discussion
JHS	Junior High School
MC	Minerals Commission
MDG	Millennium Development Goals
NGO	Non-governmental Organization
NHIS	National Health Insurance Scheme
NYEP	National Youth Employment Program
PMMC	Precious Minerals Marketing Corporation
PPE	Personal Protective Equipment
SAP	Structural Adjustment Program
SHS	Senior High School
SSA	Sub-Saharan Africa
UER	Upper East Region
UNEP	United Nations Environmental Protection
YEDF	Youth Enterprise Development Fund
YIAP	Youth in Agricultural Program

CHAPTER ONE

THE RESEARCH BACKGROUND

1.0 Introduction

This chapter provides an overview of the research and details of the organization of the thesis. The chapter comprises of four sections. The first section provides a summary of the context of youth unemployment in sub-Saharan Africa and how artisanal and small-scale mining (herein after, ASM) is rapidly gaining prominence as a conduit for reducing youth unemployment. In the subsequent sections, an in-depth exposition of the mining sector is presented, followed by the dynamics between ASM and youth unemployment in Ghana and an introduction of research objectives. Finally, the chapter concludes with a description of the overall thesis outline.

1.1 Contextualizing the problem of youth unemployment

Among the many challenges facing countries in sub-Saharan Africa (SSA), youth unemployment ranks prominently. Unemployed youth (i.e. persons between the ages of 15 and 24) constitute 60% of total unemployed people in developing countries with over three quarters of these youth living below the poverty line of less than $2 per day (ILO, 2006). Africa's population is the youngest in the world and the estimated 200 million persons currently between 15 and 24 is projected to double by 2045 (ADB, 2012). Annually, the estimated 10 million new people entering the job market in SSA must compete for the corresponding two million new jobs which are added each year resulting in huge mismatch between demand and supply for employment opportunities (ADB, 2012). As such, it is unsurprising that one of the biggest challenges facing governments is finding employment for the rapidly growing number of African youth who also disproportionately suffer the burden of poverty.

Among the different informal sector avenues which generate some employment for many youth seeking opportunities, artisanal and small-scale mining (ASM) – a low-tech, labor intensive mineral extraction and processing activity - has been gaining prominence. The rapid growth of the ASM sector in recent years has provided jobs for thousands of young people and contributed significantly to ameliorating hardships in many rural areas. The ability of ASM to provide employment within rural locations with high incidence of poverty within the broader context of the current global political economy has earned the sector the tag of *'poverty-driven activity'* from the United Nations (UNECA, 2003). With the sector employing over 10 million people across Africa and providing them a means of livelihood, governments and international organizations interested in poverty reduction are uncertain of how to deal with ASM.

The dilemma currently bedeviling policy makers and development partners of African governments are the result of some pertinent questions that have emerged due to the growing role of ASM in many rural areas. Some of these questions include: 1) should development agendas of governments change to accommodate ASM as a pivot to poverty alleviation strategies? 2) Is ASM a long-term employment option on which youth can rely? 3) Considering the environmental impacts of ASM, can a growth in the sector significantly derail environmental sustainability efforts particularly in ecologically fragile locations?

Admittedly, providing answers to these broad questions currently confronting governments and their development partners is a big challenge due to extensive geographical differences and contextual complexities associated with ASM activities across countries and within countries in SSA. To contribute to this regional level discussion, this research uses the case of mining communities in Ghana to address the questions. Ghana is selected because it has a longstanding history of ASM activities and possesses one of the most dynamic ASM sectors across sub-Saharan

Africa. Additionally, irrespective of the huge amount of resources that has been dedicated to reducing youth unemployment through intervention programs such as education, skill development projects and entrepreneurship training programs, ASM continues to be very attractive to the youth. Thus, youth engagement in ASM seems to have become the solution for dealing with unemployment for many people. This warrants thorough investigation to understand the dynamics involved. Before delving into the subtleties of ASM, a brief introduction to the practice of ASM across the sub-region is provided in the ensuing section.

1.2 Ghana's Mining Industry

Sub-Sahara Africa is well known for its unique mineral resource base and this is evidenced by ranking of countries within the region on world listings of mineral producing countries. A recent list of top gold-producing countries by the US Geological Survey (2016), for instance, places South Africa as the largest producer – a position it has held over four decades and Ghana as the tenth world top gold producer although it is Africa's second-largest gold producer. The mining industry is therefore one of the most prominent industries for most countries within the region as it is envisaged that when minerals are well-managed, that could serve as an important catalyst for industrialization and development. Besides its rankings on the global stage due to production levels, the contributions of the mining industry towards local economic growth are mostly experienced through employment creation and foreign exchange earnings. In Ghana, for instance, the industry is the leading source of government's direct domestic revenue; contributing about GHC1.65 billion its recent contribution to the country's total revenue in 2016 (Chamber of Mines, 2017). With a 45.5% share of gross merchandize exports, the mining industry is the country's leading export earner. In 2016, the revenue accrued from the minerals export is about USD5billion, an amount that places the industry above the agricultural sector and the oil and gas industry

(Chamber of Mines, 2017). The mining industry is therefore an important player in Ghana's economy as its fiscal contributions exceeds assistance from foreign development aid partners (World Gold Council, 2015). It is also estimated that, overall, the mining industry provides a number of employment opportunities for residents of mineral-endowed communities as well as migrants who are drawn to these communities in search of employment

Ghana's mining industry is divided into two major sectors – large-scale gold mining (LSM) and small-scale gold mining (SSM). Operations of large-scale gold mining in Ghana is recorded to have commenced in the early 1880s by two local individuals who later gave up their mining rights to Ashanti Goldfields Corporation. Prior to independence, the colonial government controlled the sector and this was tempered during the first president's regime. However, after the take-over by the local government, gold productions declined in the 1960s and for nearly two decades, the mining industry performed poorly. By the mid-80s, the sector had been targeted as a prospective source of foreign exchange (necessary for overall economic development) thus the transformation of the mining sector spearheaded by the Bretton Woods Institutions. According to Aubynn (2004) and Hilson and Potter (2005), the underlying influence for the growth in LSM in Ghana is the implementation of Structural Adjustment Programs (SAPs) in the mid-1980s. The SAPs and its related neoliberal policies promoted privatization of state-owned corporations hence the promulgation of the Minerals and Mining Law in 1986 which permits private and foreign ownership of large-scale gold mining. To incentivize private corporations' involvement in the mining industry, government initiated tax breaks, capital allowances and low rents payable to governments. These initiatives, backed by the World Bank, acted as baits for enormous investments into the sector by multinational mining companies. As at 2015, there were about thirteen foreign-owned companies operating across the country as licensed members of the

Chamber of Mines (Chamber of Mines, 2017). The LSM on one hand, is mainly undertaken and managed by multinational companies due to its capital-intensive nature: the need for heavy duty machinery, and improved technology. Presently, the LSM sector by far extracts most of the minerals in the country as it accounts for about 65% of total mineral production (Chamber of Mines, 2014). Furthermore, available figures from the licensed member companies of the Chamber of Mines, suggest that LSM provide direct employment to about 11,628 local people and 190 expatriates (Chamber of Mines, 2017).

On the other hand, small-scale gold mining (SSM) engages low-skilled labor and applies simple tools but accounts for about 35% of total gold produced in Ghana which amounts to about 1.5million ounces in 2014 (Chamber of Mines, 2014). SSM activities are legalized by the Small-scale Gold Mining Law, 1989 (PNDC Law 218) which allows for local ownership of a 23-acre concession by an individual or a group. Prospective small-scale miners require approval from the Minerals Commission, Environmental Protection Agency and the District Assemblies, but most miners bemoan the licencing process which they classify as very bureaucratic, time consuming and financially exhausting (Hilson et al., 2014).

An offshoot of the more developed SSM sector is artisanal mining which often represents illegal or informal mineral extraction activities that are carried out on the fringes of large-scale mining. Ghana's ASM sector has a long history which predates most of its contemporary bordering countries by almost 1000years. Based on historical accounts, ASM activities were started by local people who openly searched for gold nuggets to *'gather'* and *'sell'*, which has been translated into "galamsey" - the common name for the present day ASM activity. However, for the past two decades, ASM has become a booming economic activity in rural Ghana. This boom, as the literature explains is buoyed by frequent surges in gold prices but also, ASM has served as refuge

for tens of thousands of the people made redundant and put in precarious financial positions as a result of the economic recovery programs introduced in the 80s (Hilson & Hilson, 2015). To avoid displacements by multinational mining companies, local people engage in ASM to compete with these companies for land and mineral resources (Hilson & Potter, 2005). More so, the growth of ASM has also been attributed to the cumbersome registration and licencing process associated with operating mainstream small-scale mining. The bureaucratic process causes frustration among prospective operators as they often have to wait for a long period of time before receiving approval for business (Hilson, 2009).

By and large, ASM and SSM are largely similar in their characteristics including, low tech, and unskilled labor; as such the two names are often used interchangeably. While there is no exact global data, there are about 15-20 million people directly employed in ASM, and another 80 million are indirectly dependent on it (Maconachie, 2011). ASM is said to employ ten times more people than the LSM sector (Buxton, 2013). In Ghana, ASM is a major source of employment as a recent estimate suggests that the sector directly employs at least one million people and support another five million people in associated services (Lynas, 2014). Besides providing employment for the local people, it is now common to find foreign nationals from Ghana's neighbouring countries as well as the Chinese working at ASM camps (Armah et al., 2013). Gold produced by small-scale miners are sold to licensed dealers or buying agents of the Precious Minerals Marketing Corporation (PMMC) or directly to the Corporation.

By law, the PMMC oversees the export of gold from the small-scale sector and tasked to repatriate at least 80% of foreign exchange earned from the exports into the country. Despite this arrangement, gold is often smuggled into the world market through neighboring countries such as Togo and Burkina Faso. Although mining laws prohibit foreigners to engage in small-scale mining

or buy gold from ASM miners and other small-scale mining operators, a number of foreigners have been able to permeate the sector. According to Hammond (2017), the recent introduction of a 10% tax on gold purchases is attracting more Indians into the gold business and that also contributes to the large number of foreigners' participating in ASM. According to this author, gold dealers prefer to sell to the Indians because the former are not willing to pay the tax component on the transactions to the government whiles the Indian dealers also avoid paying taxes to the government.

In spite of ASM's contribution to different aspects of Ghana's economy such as providing employment for many people, the ASM sector is fraught with many challenges. Most importantly, the relevance of the sector is perhaps overly overshadowed by its high environmental costs, and poor occupational health and safety consequences (Armah et al. 2013; Hilson & Hilson, 2015; Kyerematen & Clarke, 2015). Due to these concerns, for the past decade, formalizing the ASM sector has been a key topic of discussion in both policy and scholarly circles. Proponents for formalization argue that the informality surrounding the ASM sector across the developing world is largely attributed to the peripheral position the sector occupies on governments and policy-makers development plans (Hilson & Hilson, 2015). They argue that, formalization which involves licencing provides a better platform for monitoring activities of ASM participants. Through a well-organized monitoring system, government can minimize and manage the environmental deficits related to the expansion of the sector. For instance, the Ghanaian government can initiate and implement industry specific environmental management tools and strategies, assist the Minerals Commission with research resources that can facilitate environmental improvements, and conscientiously prospect for deposits suitable for small-scale gold mining (Hilson, 2002). Improved geological data and adequate knowledge of areas suitable for ASM activities by

government is key to preventing unnecessary exploration and that could improve the organization of ASM (Hilson & Maponga, 2004). After a decade of this proposal, the Minerals Commission offices are still not adequately resourced, as such the staff are unable to ensure environmental compliances by miners (Banchirigah, 2008; Bloch & Owusu, 2012). In more recent years, government's initiative towards ASM formalization and regularization is manifested in the formation of ministerial task forces to clamp down on illegal ASM activities. This, is to persuade miners to legalize their operations by obtaining licenses despite the bottlenecks surrounding the registration and licensing process. In 2013, the inter-ministerial task force set up by the then NDC Government engaged in dismantling hundreds of illegal mining sites and evicted thousands of ASM miners who were largely considered to be engaged in illegal activities (GraphicOnline, 2014). This approach, however, had minimal effects on regularizing ASM activities. In July 2017, the NPP Government set up another task force, code-named 'Operation Vanguard' comprising military and police officers tasked with clamping down on illegal miners. Typically, illegal miners that are arrested are made to pay fines as well as given four to 18 months jail terms (Citifm, 2017). This approach taken by the government, clearly do not yield the anticipated results as ASM remains very attractive to the youth and the numbers of people engaged in it keep rising.

1.3 ASM and youth unemployment dynamics in Ghana

Presently, a preponderance of evidence demonstrates that rural livelihoods are detaching from agriculture and there is an increased preference for the non-farm sector. Since gold is ubiquitous in rural Ghana, its exploitation is at the centre of rural people's livelihoods. Especially among rural youth, there is preference for the ASM sector over agriculture. Empirical studies suggest that ASM demands extreme physical efforts which explains why the sector's labor force is heavily skewed towards the able-bodied youth (Tschakert, 2009; Yakovleva, 2007). In Ghana,

studies that focus on aspects of youth engagement in ASM particularly do so by highlighting some social implications such as the impact of ASM on education and child labor related issues (Human Rights Watch, 2015; Owusu & Dwomoh, 2012). The extant literature largely portrays ASM miners as a homogenous group with little considerations for other demographic distinctions among them. Due to this bias in literature, there is insufficient knowledge of youth livelihoods strategies and trajectories in relation to ASM expansion. This research therefore focuses on youth miners to expose some differences in the experiences of mining groups.

The youth of Ghana are struggling to gain employment that can facilitate their escape from poverty. According to the African Economic Outlook (2012) almost 25.6% of the youth are unemployed; and ASM is perceived to present the avenue for economic improvement (Yakovleva, 2007). Andrews (2015) anticipates that ASM in Ghana can play a major role in youth employment hence any attempt to abolish it can have adverse consequences such as increase in illicit activities including drug peddling and armed robbery. And especially for rural youth, ASM has the potential to make positive contributions to their economic wellbeing (Pijpers, 2014). Against this backdrop, it is important to understand the rapid expansion of ASM in the context of widespread youth unemployment. This approach better exposes the underlying factors that encourage youth participation in ASM.

Furthermore, while numerous studies on mining have already been conducted in Ghana to expose some of the challenges in the sector to guide policymakers in alleviating such problems (see Armah et. al., 2016, Hilson 2002, Owusu & Dwomoh, 2012), certain aspects of the sector remain inadequately clear and less understood. It is for instance unclear why youth continue to engage in an activity considered highly risky and environmentally unfriendly. Thus, this study breaks new grounds by focusing on how youth miners perceive risk associated to their work and

their contribution to environmental depletion by using narrations gathered from the Upper East Region (UER). The UER is selected for this study because despite its longstanding history in ASM, research from this part of the country is very limited. The UER also has some of the newest mining communities in the country.

1.4 Research Objectives

Considering that ASM is recently emerging as a relevant economic sector for most people in the UER, especially the youth, and given that the government agency - the District Assemblies, are giving mining companies prospecting licenses, it is necessary to investigate what is motivating the youth into ASM. Consequently, this research has the following objectives:

1) To understand the primary reasons why the youth are increasingly engaging in ASM activities.
2) To understand how youth miners perceive their personal occupational health as well as the environmental and community risks posed by engaging in ASM.

More specifically, the proposed research seeks to answer the following questions:

1) What are the primary motivations driving youth into ASM activities in relation to present opportunities available to them?
2) What are youth miners' perceptions on their personal health risks related to their work?
3) And what are their perceptions also on the environmental (and communal) health challenges related to their work?

1.5 Thesis Outline

The thesis is divided into seven chapters; and begins with this introductory chapter which highlights the study background, research context and specific research goals. This chapter is

followed by chapter two which constitutes the literature review section and the theoretical framework employed in the study. The chapter provides a literature review on rural livelihoods in SSA which suggests widespread diversification and the livelihood options available to rural youth. It describes the Livelihoods Approach, how the framework applies to the study of rural livelihoods and its relevance to the present study. It further progresses to position the study within the field of human geography and risk analysis by detailing the various occupational health and environmental deficits associated with the ASM sector.

In chapter three, the methodological approach to the study is explained. Here, an in-depth explanation of the research design, theoretical approach, ethical approval, processes of data collection and analysis is provided. It, for instance, emphasizes the importance of using qualitative methods such as in-depth interviews and focus group discussions to obtain information on the lived experiences of miners and the interpretations they give to their involvement in ASM. The chapter also provides a detailed description of the social, economic and demographic features of the research communities. After methodology, the results of this study are presented in three chapters - (Chapters 4, 5 and 6); and each of these results chapters seek to answer one of the research questions. The results chapters therefore address the motivating factors leading to increased number of youths in ASM camps in the UER and youth miners' perceived occupational risks and environmental challenges associated with their work. The results presented are a combination of data gathered from interviews with youth miners and other key informants from various government agencies and health facilities, and focus group discussions held with youth miners only.

The final chapter provides discussions on the various findings by situating the results broadly in the rural livelihoods discourse and more specifically youth unemployment and the

growth of ASM in Ghana. It recommends a shift in policy options for youth employment offered by governments and their development partners. It also has a conclusion section which outlines the contributions of this research, the limitations of the research, and makes suggestions for potential future research.

CHAPTER TWO

LITERATURE REVIEW AND THEORETICAL PERSPECTIVES

2.0 Introduction

This chapter provides an overview of the literature on rural livelihoods in sub-Saharan Africa (SSA) and it is presented in five sections. The first section explores the changing trends in rural livelihoods with an emphasis on the current role of the non-farm sector in rural people's lives, how rural people secure their livelihoods, causes of livelihood changes and the socio-economic factors that influences livelihoods in rural areas. The second section provides a description of Bebbington's (1999) conceptual framework on rural livelihoods, which informed this research. The subsequent sections propose a risk perception analysis, a growing theme in health geography, to examine miners' perceived risks related to their work. Finally, the chapter concludes with a summary of the current trends in rural livelihoods and the gaps in the existing literature.

2.1 Rural Livelihoods in sub-Saharan Africa (SSA)

Scholarly discussions on rural livelihoods date back to the early 1980s and have persisted into the new millennium. This is so because conditions in the rural Global South have worsened over the years and thus permits further deliberations on the lives of rural people. Population increases caused by persistent high fertility rates, extreme poverty levels and participation in smallholding enterprises, especially within the agricultural sector, characterize the rural areas in the Global South. Overall, SSA's population is growing at more than twice the pace of any other region and this growth is due to decreases in infant and child mortality rates and increase in life expectancy rates (McArthur, 2014). The overall fertility rate in SSA is 4.7 births per woman while the number of births per woman globally is 2.5, a rate nearly 90% higher than the world standard (Bish, 2016). Rural women are even more affected as their fertility rates are much higher than

women in the urban areas due to entrenched cultural practices and social institutions that influence women's access to education and contraceptive use (Ekane, 2013). Despite an increasing global urban population, recent report on the world's rural population from the World Bank estimates that about 45% of the world's population still lives in rural areas (Beegle et al., 2016); and this proportion is not expected to change drastically for at least two more decades. The large and growing population affects distribution of limited assets such as land, which further exposes the rural dwellers to destitution. Rural peoples' experience of poverty is not only limited to lack of income or money, but also the lack of multiple assets and resources that deprives them of a material well-being.

Sub-Saharan Africa is one of the few regions in the world where the proportion of the poor has been rising over time. Recent report by Beegle et al. (2016) suggest that there are presently more poor people in SSA than there was nearly three decades ago. Despite an increasing urban poor population, poverty remains predominantly a rural phenomenon with nearly 70% of the world's poor living in rural areas (Olinto et al., 2013). Compared with the rest of the developing world, SSA lags in the fight against rural poverty as current data stipulate nearly 42% of the region's rural population are poor. These global and regional statistics reveal the magnitude of the poverty problem affecting the rural Global South but often mask figures at the national level. For instance, existing evidence from Malawi and South Africa shows that rural poverty at the national levels is a major developmental challenge. In Malawi, poverty affects almost half of its rural population (Chirwa & Dorward, 2013); and in South Africa, it is estimated that about 77% of rural dwellers live in poverty (Leibbrandt et al., 2010). In the context of Ghana, though hailed as one of the few countries in SSA that has made strides in poverty reduction by meeting the Millennium

Development Goal (MDG) Target 1A[1] (Ghana Statistical Service, 2015), its rural population is largely poor, with about 45% of the country's population living in rural areas and 39% of this population living below the poverty line (Dary & Kuunibe, 2012). The proportion of rural poor is almost four times higher than the urban poor households (Cooke et al., 2016; Beegle et al., 2016). More so, regional disparities exist between Northern and Southern parts of the country with people living in the Northern part (Northern, Upper West, and Upper East Regions) bearing the greater burden of poverty. World Bank (2015) estimates reveal that one out of three poor people lives in Northern Ghana and poverty conditions are said to be deteriorating over time. To address poverty needs in rural areas households typically engage in a range of activities to secure livelihoods.

Several definitions for *'livelihoods'* are put forward in the literature but the most widely used is that propounded by Robert Chambers and his colleague, Gordon Conway in 1992. According to these authors, "a livelihood comprises the capabilities, assets (including both material and social resources) and activities for a means of living…" (Chambers & Conway, 1992, p.7). A livelihood simply refers to the means of gaining a living and this involves the combination of assets (or capital as sometimes referred to) available to the individual and/or household and the actions or activities they engage in to make living. Rural people mobilize the assets at their disposal by engaging in activities that can help them to cope with their socio-economic challenges. The activities they engage in to secure livelihoods principally involve interactions with their environment – the exploitation of natural resources such as land (De Sherbinin, 2008). The Overseas Development Institute estimates that over two-thirds of the developing world's three billion rural inhabitants live in households involved in smallholder agriculture (ODI, 2008). Rural

[1] Target 1A: Halve, between 1990 and 2015, the proportion of people whose income is less than $1.25 a day

people often engage in smallholder farming activities, fishing, and livestock production as a major source of livelihood.

Livelihood strategies are shaped by the complex interplay of multiple factors including environmental, social and economic factors. In rural Ghana, livelihoods are influenced by agro-ecological characteristics (induced by climatic change), production systems (on- and off-farm income diversification), and power dynamics (access to and control over land resources, gender relations). Agriculture, predominantly subsistence smallholder production, which is a major livelihood strategy in rural Ghana, is faced with various challenges. Smallholder agricultural activities are vulnerable to climate change evidenced by sporadic rainfall patterns, which has adverse impact on production. Northern Ghana, located in the Sudan and Guinea Savannah agro-ecological zones, faces the worst ecological challenges. As a typically arid climatic area, with changing climatic patterns, it is the most vulnerable to crop production (Antwi-Agyei et al., 2012). MacCarthy et al., (2013) further expose this challenge through their assessment of climate change impact on maize production in Ghana's Guinea Savannah and Forest Savannah ecological zones. Their results indicate 19-41% reductions in maize yield across these ecological zones. According to Laube et al., (2012), when farmers in Northern Ghana are affected by the climatic challenge they resort to diversification of production and/or migration and this leads to rise in engagement of rural people in other non-farm sectors including mining.

As Scoones (1998) suggests, in order to survive and prosper, diversification of livelihoods or income sources is one of the three options open to rural people. First, rural people have the option to increase their agricultural output by intensifying production through increased financial investment or cultivation of larger tract of lands. Second, rural households can resort to migration - temporal or permanent - to engage in activities that provide income; and last, the household could

choose to engage in different or multiple activities to supplement its income. Rural households across SSA however show much preference for the latter option - diversification - by complementing agricultural production with their participation in non-farm activities[2].

2.1.1 Livelihood diversification and the growth of the non-farm sector in rural SSA

Research efforts to investigate the rural non-farm sector started in the early 1970s in acknowledgement of the scale and importance of the non-farm economy to rural people. By the late 1990s, rural livelihoods had become increasingly more diversified as households search for alternative income generating avenues. This contributed to scholars such as Ellis (2000) and Haggblade (2007) focus on the diversification thesis. According to Ellis (2000), livelihood diversification is a process by which the household constructs a diverse portfolio of activities and assets to generate more income for survival and an improved standard of living. Ellis proposes that rural livelihoods which had mainly been created by the reliance of households on peasant farming and livestock production is gradually changing and as a result, rural poor people are beginning to engage in multiple sources of income rather than securing occasional economic opportunities (Ellis, 1998). By diversifying, households who mainly depend on agricultural production deliberately develop other income streams and social networks that permit them to rely less on rain-fed farming activities (West, 2013).

Multiple motives, however, prompt households and individuals to diversify their assets, activities and income sources. Rural people develop different livelihood strategies which are driven by the opportunities and constraints within their biophysical and socio-economic environment (Tittonell et al., 2010). Individuals and households for instance are incentivized to

[2] Economic activities beyond crop and livestock production

diversify their activities and income sources by either disengaging in farming activities due to perceived better prospects *(opportunities)* in the non-farm sector, or be detached from agricultural production due to environmental and other socio-economic pressures that impede or worsen their productivity *(constraints)*. These factors are sometimes classified into what has been known in the literature as the 'push' and 'pull' factors.

Livelihood diversification is complex and the strategies can be numerous as well. Traditionally, a rural livelihood diversification process begins with either altering of the crops cultivated by the smallholder farmer by complementing the principal crop with another, or a complete change from one crop to the other; and this extends to investment in livestock production. Presently, the literature proposes two forms of diversification: first, household dependence on both agricultural and non-farm activities without much contribution from the non-farm sector in terms of income generation (Brycesson, 1999). Second, the creation of livelihood portfolio with farming included but augmented by other engagements which is usually non-agrarian (Bebbington, 1999); and the bulk of the household income is generated through their participation in non-farm activities. For several decades, livelihoods created in the non-farm sector has received much attention in the rural development literature (Barrett et al., 2001; Haggblade et al., 2007; Davis et al., 2010; Winter et al., 2010). These studies primarily seek to understand the importance and features of rural non-farm income and employment, and a major conclusion from the studies is that rural household income diversification is the norm rather than the exception in SSA (Davis et al., 2014). The findings of these studies, however, show diverse effects of livelihood diversification on different households within different social contexts. In measuring the extent of income diversification among rural households in SSA, and how this diversification compares with countries in other regions, Davis et al., (2014) find that about 45% of the rural households in SSA

participate in the non-farm sector but a large proportion of their income is derived from farming. The results from a 2004 dataset of over fifty countries from SSA used for this comparative study, show at least 55% of rural households' income is generated from agricultural sources, and this soars to about 80% in a few specific countries - Ethiopia, Madagascar, Malawi, and Nigeria.

Meanwhile, employment in the rural non-farm sector is also proving a good income generator and growing in importance in other settings, mainly due to the significant income contributions it provides toward the maintenance of households. Fox and Sohnesen (2012), indicate that rural non-farm income comprises around 40% of household incomes in SSA and other studies by Kuiper et al. (2006) and Gordon and Craig (2001) are representative of this phenomenon. More rural households are complementing agricultural production with non-farm activities and the incomes from the non-farm sector help them to confront economic shocks associated with droughts and other events that adversely affect their livelihoods. The national statistics even makes its more compelling; in Malawi, 64% of rural household income earnings is from non-farm sector participation. High numbers of Ghana's rural people engage in the non-farm sector to supplement agricultural production and this non-farm engagement is crucial for poverty alleviation in the country (Ackah, 2013). In Northern Ghana, where decreased and erratic rainfall are major catalysts of famine and droughts which place rural households in vulnerable and extremely harsh conditions, most farmers diversify; and so far, non-farm work seems a valuable source of income which contributes to household consumption smoothing (Owusu et al., 2011). Income from non-farm activities enhances food security especially in the Upper East Region, where the main strategy for meeting food shortages among households is to purchase food using non-farm income to buffer for the minimal farm produces caused by climatic variations

(Whitehead, 2002; Wossen & Berger, 2014). Indeed, the consequences of the diversification processes and outcomes to households are different in every social setting (Loison, 2015).

Besides income generation, which is the immediate outcome associated with diversification, other benefits are enumerated. According to Ellis and Allison (2004), when a household diversifies, it insulates itself from environmental and economic shocks, trends and seasonality and this makes the household less vulnerable. Rural livelihood diversification could absorb the surplus labor unengaged by the agricultural sector in rural areas, suggest more remunerative activities to supplement or replace agricultural income, provide income potential during the agricultural off-season, and provide a means to cope or survive when farming fails (Gordon & Craig, 2001). Even though on a large scale, most smallholders do not earn high incomes or accumulate wealth through livelihood diversification, the process persists (Loison, 2015).

2.1.2 Livelihood options for rural youth in SSA

Agriculture still features prominently on the development agenda for most SSA governments especially when the discussions revolve around rural youth employment and development. Proponents of this view believe that agricultural production is a palpable (if not the obvious) opportunity through which the problem of limited economic opportunity for the rural youth can be addressed (Sumberg & Okali, 2013). Especially within the context of persistent high youth unemployment, policy makers within SSA and other development partners such as the World Bank coalesce in their efforts to curtail the unemployment problem by projecting the agricultural sector as a possible solution (Filmer & Fox, 2014). For instance, programs at the national levels such as Malawi's Youth Enterprise Development Fund (YEDF) (Chinsinga & Chasukwa, 2012) and Ethiopia's Agricultural Development Led Industrialization (ADLI) (Tadele & Gella, 2014) provide some good examples of the partnership between governments and

development organizations in their bid to curtail the incessant youth unemployment challenge. In the context of Ghana, the National Youth Employment Program (NYEP) module - Youth in Agriculture Program (YIAP) is a case in point. This program started in 2010 with the overall distinct objective of making smallholder agriculture attractive to youth, and therefore increase youth employment opportunities especially in rural areas, which can also reduce rural-urban migration, (Gyampo, 2012). Under this program, the government, through the Department of Food and Agriculture provides youth with portions of land acquired from chiefs or private individuals through the block farm system. The youth also receive ploughing services as well as agricultural inputs such as seeds and fertilizers. The results of this YIAP module on rural youth employment is however abysmal and this, according to Benin et al. (2013), is based on two factors. First, because on average only 25% of YIAP beneficiaries can be considered youth, and second, the potential income from the program is significantly low hence participants' refusal to remain recipients. Based on these inefficiencies, Sumberg et al., (2014) argue that government initiated programs such as YIAP are never likely to bring any transformative employment opportunities that will attract large numbers of the (rural) youth into farming.

Government's persistent failure in making smallholder agriculture lucrative as evidenced in the implementation of programs such as above, a new development in the rural livelihoods literature is '*de-agrarianization'* which suggests rural peoples' departure from agricultural activities (Yaro, 2006). Especially for rural youth, a dominant narrative is 'farming is never on the minds of the youth' to imply that the rural youth are consistently showing unfavorable attitude toward agricultural activities by disengaging from the sector. The de-agrarianization phenomenon across rural Ghana seems pervasive as the government records an aging farming population - the average farming age is 55 (MoFA, 2011). This notwithstanding, other explanations documented

in the literature as factors responsible for an overall poor performance of the agricultural sector and low participation of youth in agriculture include access to land, and high cost of farming inputs such as fertilizers and pesticides (Naamwintome & Bagson, 2013; Nyantakyi-Frimpong & Bezner-Kerr, 2015). Customary laws coupled with high land prices due to neoliberal policies such as privatization, which leads to large-scale acquisition of land by corporations prevent youth from accessing this most crucial resource (Cotula, 2012; Sassen, 2013). Presently, Ghana stands as one of the top land lesser states in SSA with significant land allocation to biofuel production, large-scale oil palm production, and other non-food purposes such as mining (Boamah, 2014; GRAIN, 2012). The resulting effect of leasing large tracts of rural lands to corporations is worsening poverty levels among rural dwellers since they lose access to a vital resource – land, and that precipitates non-agrarian engagements (Nyantakyi-Frimpong & Bezner-Kerr, 2017; Schoneveld et al., 2011). Despite its limited land and high food insecurity, the land-grab phenomenon manifests itself in Northern Ghana, where a local chief gave away about 38,000 hectares of land to a Norwegian company to produce jatropha (Nyari, 2008).

Within the de-agrarianization and diversification process described above, the literature records a long-standing relationship between farming and ASM in Ghana. Especially among male household heads, there are intermittent shifts of labor between crop production and work at the mining camps. During the dry season, household members, especially the male household heads, rush to mining camps and return to the farms when the rains set in. Hilson and Garforth (2012) provide insights into the livelihoods of miners in Southern Ghana. According to these authors, rural people complement farming with ASM and this is a beneficial arrangement for the household. The period between the dry and wet seasons only elapses without much distress when work at ASM camps provides monetary rewards which further helps the household to buy grains which

are insufficiently produced from the farms. In addition, incomes from ASM activities assist to build up savings that are reinvested into farming. Maconachie and Binn (2007) also infer that there is a strong linkage between farming and the informal mining sector which cannot be ignored. According to the authors, farmers' response to the mining population's demand for food is crucial for sustaining rural livelihoods; nonetheless, they admonish that the environmental impacts of such relationship need attention too. The findings of this research paint a broader picture of an inextricable relationship between the farming and informal mining sectors for rural development. An interesting trend in this de-agrarianization process is while adult household members complement agricultural production with non-farm activities, the youth are disengaging in farming. Youth are increasingly choosing non-farm activities as their means of livelihood and ASM has become a main one that engages many of them. In most cases, ASM represents the most promising, if not the only income generating avenue available for the youth. Even though many livelihoods research have detailed how rural poor people maintain their livelihoods through diversification and the importance of that to their survival little is known about the cohesion among household members and communities alike in the decision-making process for the livelihood choices of the youth.

Researchers recognize the relevance for an analytical technique that helps to delve into and gain in-depth understanding of how rural people build their livelihoods. Poor rural people's activities are distinct – they are predominantly economic activities on the small-scale and therefore analysis of their livelihoods require different techniques from those generally used in analyzing commercial agricultural or enterprises in the formal sector. So far, the conceptual framework widely applied to the study of rural livelihoods is the Livelihood Approach as it provides a better description of rural people's activities that are influenced by the assets available to them.

2.2 The Livelihood Approach

The livelihood approach is a perspective applied to the study of rural people's development in the rural livelihoods scholarship. Since the late 1980s, highly influential writings from researchers such as Ellis (1992), Bebbington (1999) and Scoones (2009) have applied this perspective in their analysis of rural livelihoods by principally assessing how rural people survive. Over the years, its application has extended to international development organizations including Oxfam, Care International, and the UK Department for International Development (DFID) which apply this to studies on rural lives in the developing world. These organizations use the approach to facilitate the achievement of their objective which is mainly to reduce poverty and affect rural people's growth and development. As Scoones (2009) posits, development scholars and agents who apply this approach have a close interest in poverty reduction in the developing world. Appendini (2001) also states that the fundamental objective of the livelihood approach is to search for more effective methods to support people and communities in ways that are more meaningful to their daily lives and needs, as opposed to ready-made interventionist instruments. DeHaan and Zoomers (2005) acclaim the relevance of this approach to the study of rural lives by referring to it as a direct response to the disappointing results of previous approaches such as those based on income and consumption criteria in devising effective policies to alleviate poverty. According to them, the livelihood approach is an all-encompassing one with the ability to produce effective results towards poverty reduction. For development organizations, the livelihoods approach provides a good framework for the analysis of the impact of their projects. Applying a livelihood perspective to a study also indicates the researcher's interest in how different people, with varied social and economic characteristics, in different places live and make a living.

Many scholars undertake livelihoods studies using this approach to expose the numerous strategies adopted by rural people. After the World Bank's acceptance of ASM as one of the dominant livelihood strategies for the rural poor, many researchers focus on different aspects of the ASM phenomenon through the livelihoods approach. For instance, Maconachie (2011; 2014) consistently reveals the relevance of Sierra Leone's diamond industry to its rural people especially the youth by studying the assets available to the survivors of the protracted civil war. Côte (2013) and Werthmann (2003) study the factors necessitating an increase in rural participation in small-scale gold mining and its benefits to the participants in Burkina Faso; and Fisher et al., (2009) demonstrates the applicability of the livelihood approach to the study of ASM sector in rural Tanzania.

Analytically, the livelihoods approach focuses on the assets and capabilities that the household possesses and how it organizes these resources to improve the well-being of its members. The framework suggests that rural livelihoods should be analyzed and understood in terms of people's access to five types of assets (capital). This consists of examining the ways in which people combine and transform assets to meet their material and economic needs. It further proposes an examination of how households expand their asset bases by engaging with other actors through relationships governed by the state, market and civil society (Bebbington, 1999).

Figure 2.1 provides a graphical depiction of the framework:

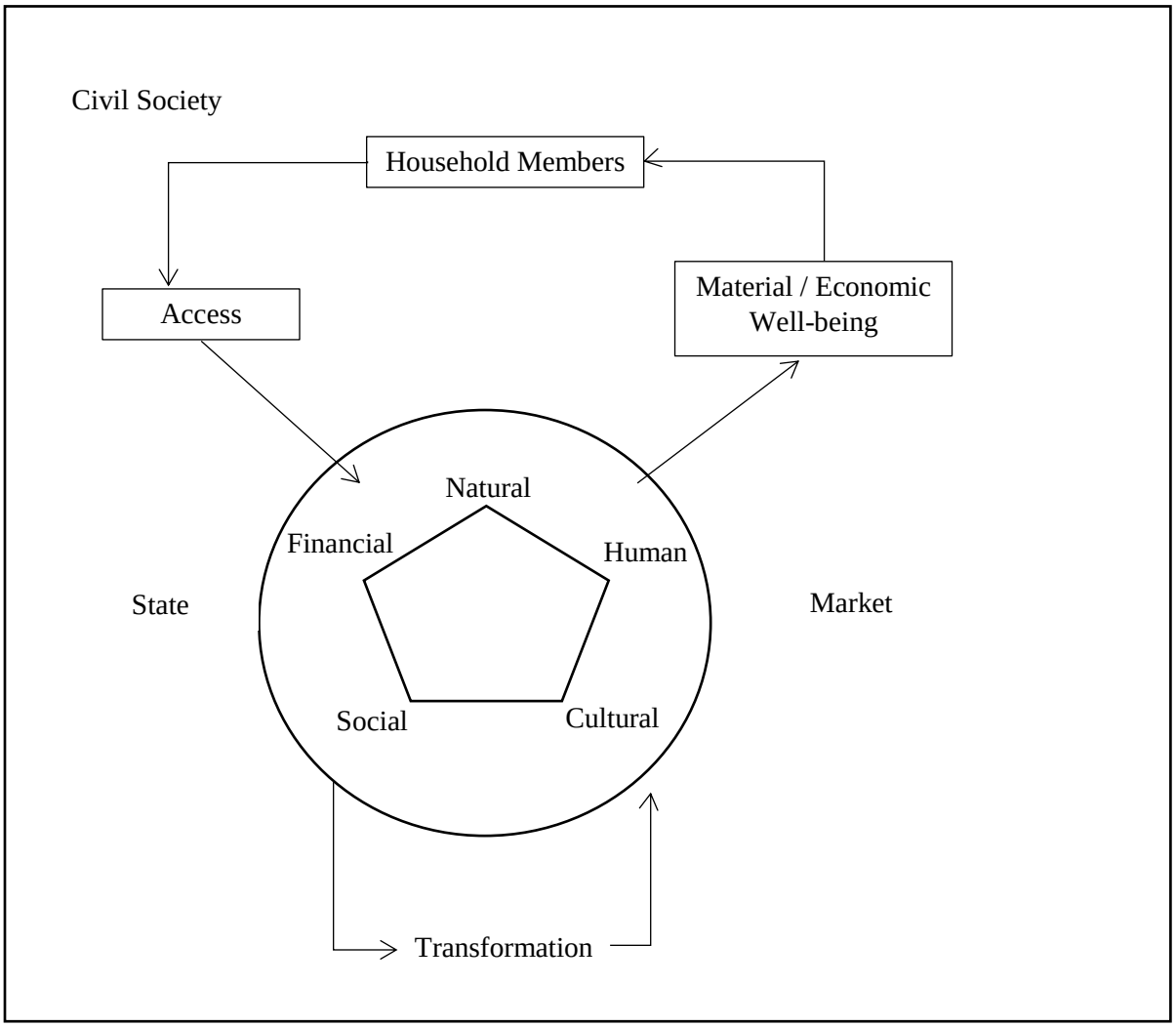

Figure 2.1: The Livelihoods Framework (Source: Adapted from Bebbington (1999)

A key feature of the livelihoods framework is its emphasis on assets that make up the *'assets pentagon'*. Box 1 below explains the different types of assets.

Box 1: Summary of Different Types of Assets

Capital/Assets

Natural capital: the natural resource stocks from which resource flows useful for livelihoods are derived (e.g. land, water, wildlife, biodiversity, environmental resources).

Social capital: the social resources (e.g. networks, membership of groups, relationships of trust, access to wider institutions of society) upon which people draw in pursuit of livelihoods.

Human capital: the skills, knowledge, ability to labor and good health important to the ability to pursue different livelihood strategies.

Physical capital: the basic infrastructure (e.g. transport, shelter, water, energy and communications) and the production equipment and means, which enable people to pursue their livelihoods.

Financial capital: the financial resources which are available to people (whether savings, supplies of credit or regular remittances or pensions) and which provide them with different livelihood options.

Source: Scoones (1998).

In most livelihood analysis conducted by development geographers, the 'household' is considered the helm for generating a living hence the most important unit of analysis and a single decision-making unit which maximizes its welfare subject to a range of income generating opportunities and a set of resource constraints (Ellis, 1998; Niehof, 2005). Nonetheless, De Haan & Zoomers (2003) argue that rather than seeing the household as a 'harmonious' unit, individuals within the household, pursue personal ways to improve their lives. Individuals have become less passive but play active roles in shaping their livelihoods. Most of the studies however do not

consider the ever-changing patterns in rural livelihoods where individual household members are taking up activities devoid of decisions at the household level. In many cases, traditional solidarity-base principles of pooling incomes, consumption, and labor force within households have weakened considerably thus, although individuals remain members of the household unit, they are increasingly acting alone as the interests of the individual do not always remain consistent with the family goal (De Haan & Zoomers, 2003). According to West (2013), diversification is becoming more and more individualized as members of households can decide with a considerable autonomy, on the activities they like to engage in without the consideration of household heads. The individual represents a unit worthy to be studied because individuals undertake economic activities besides the household also engaging in a collective activity (Ellis, 2000). This study seeks to provide a deeper understanding of this trend of *individualization* in the livelihoods diversification literature by profiling the livelihoods formed by youth in the study area.

Livelihoods and risks are closely linked; and especially for rural people, extreme climatic conditions and market uncertainties are not the only risks to manage. Specifically, for individuals or households that disengage from agrarian activities to participate in the perilous ASM sector, they are prone to very dreadful mining-related risks (Smith et al., 2016). According to Almaden (2015), the dependence on mining puts people on a high level of vulnerability and this state of vulnerability influences the ability of people to anticipate and overcome hazards.

2.3 Health and Risk Associated with ASM

The health of youth is extensively researched, with most of these studies prominently featuring topics on HIV/AIDS and reproductive and sexual health (see Bankole et al., 2004; Kahn and Mishra, 2008; Michielsen et al., 2010; Varga, 1997) and other risky behaviors such as substance abuse (Doku, 2012; Dahoma et al., 2006). According to the International Labor

Organization, mining is one of the worst forms of child labor (ILO, 2002), yet besides the attention on child labor, discussions on work related health or risk affecting the youth, particularly within the ASM sector is limited. It is however, widely documented that miners who engage in ASM activities are prone to occupational hazards and are agents of environmental contamination and destruction as well. The ensuing two sections outline the health and environmental complications related to ASM as evidenced in the extant literature. This, later on helps to investigate and expose youth miners' perceptions of these problems that emanate from their work.

2.3.1 Occupational health problems in the ASM sector

An individual's health connects to his choice of work, as work shapes his exposure to a wide array of physical and environmental conditions that influence health (Schulte et al., 2007). According to the ILO (2014), every year, there are about two million deaths caused by work-related accidents, with another 300 million accidents causing extended absenteeism from work. Where national data exists, mining usually ranks among the first top three occupations with high occurrence of accidents, injuries and fatalities (Vingard & Elgstrand, 2013). Mining, in general, is an extremely dangerous occupation that exposes those who engage in it or live in host communities to various harmful chemicals and very precarious working conditions, which pose severe health problems.

Although ASM presents a critical rural livelihood strategy especially towards poverty reduction (Bryceson & Jønsson, 2010; Fischer et al., 2009; Labonne, 2013; Smith et al., 2016), its negative consequences on miners and host communities cannot be ignored. The practice of ASM is particularly associated with many critical health and safety challenges because miners engage in perilous manual labor while applying crude extraction and processing methods (Gratz, 2009). The current literature records occupational risks associated with ASM to include personal

accidents, injuries and deaths; and social hazards consisting of high prevalence of sexually transmitted diseases (STDs) especially HIV/AIDS among miners, miners' indiscriminate engagements in vices such as unwanted pregnancies, alcoholism and substance abuses (Dinye & Erdiaw-Kwasie, 2012; Gibb & O'Leary, 2014; Jønsson & Bryceson, 2009). For example, Elenge et al., (2013) record that artisanal miners in the Katanga Province in DR Congo face high risks of accidents and contusions majorly in the upper limbs through tools handling. In Tanzania, the main cause of accidents and deaths among ASM miners in the Geita district is cave-ins (Kituala, 2006).

Ghana, like most countries in the SSA with a booming ASM sector, has no systematic national or local-level surveillance of injuries hence very little information in relation to reported occupational injuries from ASM is available. For this reason, most of the accidents that occur in mining camps, except those that result in mass fatalities, go unreported as they do not appear in the public domain (Basu et al., 2015; Smith et al., 2016). Nonetheless, the results of two recent studies conducted in mining communities in the Upper East and Western Regions, reveal a high occurrence of injuries in ASM camps; and especially among miners with lower levels of education, the major causes of these injuries are falling objects and tools and machinery handling (Calys-Tagoe et al., 2015; Kyeremateng-Amoah & Clark, 2015). The local news is however replete of reports regarding mine cave-ins which causes severe injuries and in most cases, fatalities (NewsGhana, 2013; ModernGhana, 2012; 2015; Myjoyonline, 2015). In fact, cave-ins feature often as the main cause of deaths in one of the ASM camps selected for this study. For instance, the media reports of ten lives and another five that were lost in 2014 and 2015 respectively in one of the mining sites in the study area (Citifmonline, 2014; 2015). Although the media reports provide minimal representation of the overall injury and fatality experience in ASM camps, these reports nonetheless provide information on the gravity of health challenges associated with the

sector. Furthermore, risk of other health hazards such as respiratory and cardiovascular problems and noise-related ailments are acknowledged as some of the deficits associated with ASM (Yakovleva, 2007; Basu et al., 2015). Considering the health and safety effects indicated and also recorded in the literature, one would expect that to be deterrent for youth engagement in ASM activities. Unfortunately, this does not seem to be the case given the increasing number of people (especially the youth) engaging in ASM (Lynas, 2014). Meanwhile, Basu et al., (2015) caution that this increased growth of the sector suggests a concomitant increase in the rate of accidents and injuries. For nearly two decades, the tremendous growth of the sector across SSA and particularly Ghana, contributes to the continual investigations on various aspects of ASM; and most importantly, the focus on the associated health and ecological complications in recent times. There is however, scanty literature on miners' perceived occupational and environmental risks.

More so, the focus on youth miners in this study is relevant as this cohort are more susceptible to some of the recorded mining complications due to their size, physiology or anatomical differences and psychological characteristics compared with their adult counterparts (Clark-Bennett et al., 2004; ILO, 2002). Investigating the perceptions youth hold on occupational hazards in ASM do not only help to enhance the knowledge on the trade-offs made by rural poor people in securing livelihoods but also reveal the role of some socio-demographic influences on risk perceptions.

2.3.2 The Environment and ASM activities

Mining communities are usually exposed to significant discharge of various toxins into the physical biosphere which adversely affect the natural environment; and even after activity closures, mining communities are faced with deplorable environmental challenges. ASM communities are prone to hazards especially due to the use of toxic chemicals such as mercury and

sodium cyanide for extracting the gold. During a roundtable session organized by the World Bank, mercury pollution and land degradation were listed as the principal environmental problems caused by extensive small-scale gold mining (Barry, 1996). The literature records some of the devastating effects of the use of mercury by ASM miners across SSA. For instance, Ncube-Phiri et al., (2015) record that by panning gold at river banks and surrounding areas, huge amounts of loose silt and heavy metals are discharged into river systems which results in high risks of water siltation and flooding in Zimbabwe. According to Taylor et al., (2005) and Kitula, (2006), ASM miners contaminate water bodies in the Geita district, Tanzania, and this, occurs through the diversion of rivers and water siltation caused by run-off mining tailings and mercury. Banza and his colleagues also report that urinary assessments conducted within mining communities in the Katanga Province, Congo, reveal community members' (miners and non-miners) exposure to cobalt and other toxic metals which negatively affect their health (Banza et al., 2009). The effects of mercury on miners' health and the environment is undoubtedly grave; mercury poisoning for instance can cause different skin rashes and inflammations, and when inhaled, it attacks the central nervous system leading to brain malfunctioning, and lungs and kidney damages (Gibb & O'Leary, 2014). Due to the perilous nature of mercury, for over a decade now, safe mining practice is advocated through the initiation of the Global Mercury Project in 2003 and United Nation's Environmental Protection (UNEP) Mercury Program 2009, Decision 25/5[3]. The core task of these projects is to advocate for reduction in mercury emission by the sector whiles they seek to introduce cleaner mining technologies and further reduce the health challenges especially related with ASM. They suggest that mercury emission can be reduced without necessarily decreasing the

[3] Decision 25/5 identifies mercury as a chemical of "global concern" due to its negative environmental and human health effects and requests specific measures be implemented to limits its use. It also recommends raising awareness of mercury-free alternatives for reduction in mercury related hazards in ASM communities.

quantity or weight of gold recovered hence the introduction of retorts to miners. Retorts are however unpopular among miners and mercury is still widely used in ASM camps to extract the gold due to its availability and a longstanding perception of the relevance in amalgamation (Basu et al., 2013). The amalgamation process however transforms elemental mercury into methyl mercury – a toxic compound which poses threat to human and animal lives (Ncube-Phiri et al., 2015). Artisanal gold mining is currently the largest single source of atmospheric mercury, accounting for 37% of annual emissions (Armah et al., 2016).

By the new millennium, due to the surging ASM activities across the developing world, scholars had begun researching into the environmental impact of the sector and it is confirmed that across SSA, environmental awareness within the ASM sector is generally low (Hilson, 2002; Smith et al., 2016). This explains why most of ASM operations do not have effective environmental safeguards in place to curb or surmount the ecological deficits associated with the sector. As the challenge persists, the possibility of having an environmentally clean ASM sector and practice in SSA is contested (Hinton et al., 2003). The environmental effects of ASM can be so devastating that in most cases, it conceals the socio-economic importance of the sector to rural peoples' lives, and this ecological cost becomes the main reason why governments, host communities and civil society organizations alike advocate for a crackdown in ASM activities. For instance, due to the pervasive environmental problems caused by unregulated ASM activities in Ghana, there is a recent outcry by a large proportion of people, led by a coalition of the local media calling for an immediate halt in ASM activities. According to Amegbey & Eshun (2003), the main environmental problems associated with ASM activities in Ghana are ecosystem destruction, environmental degradation, and mercury pollution. ASM activities usually begin with the clearing of farmlands or lands otherwise demarcated for agricultural production. This is followed by the

construction of mining pits which involves the removal of the vegetation cover and other layers of the top soil through to the gold bearing ore (Kessey & Arko, 2013). The various layers of soils removed are lumped together around the pits either to be washed away by the rains which eventually leads to land degradation or in some rare cases miners sell this waste to construction firms (Kessey & Arko, 2013). The problems caused by clearing lands for ASM activities include soil erosion, loss of biodiversity, the extinction of plant and animal species which disrupt the eco-system and scarcity of land for farming activities. Garvin et al., (2009) provide a typical case of loss of land to mining activities in the Western Region. According to them, only 30% of total land in the Wassa West District is used for farming activities and this shortage of farmlands emanates from the designation of majority of land in the area for mining purposes. In the Amansie West District of the Ashanti Region, about 70% of the household heads interviewed, report that ASM activities contribute to degradation of their lands and according to residents within the mining communities, land degradation is one of the major effects of ASM. This, they attribute to clearing of the vegetation, the use of heavy machines and toxic materials by the ASM miners (Awatey, 2014). Also, by removing the top soil which contains humus for agricultural production, the land is rendered incapable of supporting plant growth and other land-users are derailed of their livelihoods which further contributes to unemployment and food insecurity (Adomako et al., 2014; Aubynn, 2004; Tschakert, 2009).

There also exists a strong evidence of indiscriminate discharge of mercury, tailings, and other toxins that cause serious eco-complications including contamination of biotic and abiotic factors such as water bodies, sediments, soils, and plants in ASM sites across Ghana (Akpalu & Normanyo, 2017; Basu et. al., 2015; Tschakert & Singha, 2007). Media reports from the Eastern Region of Ghana, for instance, state that Birim and Densu Rivers - water bodies that serve as main

sources of drinking water for several communities - are seriously polluted through ASM activities. The same is reported of water bodies in Nkroful and Obuasi in the Western and Ashanti Regions respectively (NewsGhana, 2014; The Chronicle, 2014); and water pollution is one of the core propellers of communal agitations against ASM activities across the country. In the Upper East Region, residents in ASM communities especially those directly involved in the mining activities, have traits of mercury in their hair and urine; this being the results of consuming fish contaminated by mercury (Paruchuri et al., 2010).

Considering the review above, current studies on the environmental consequences of ASM activities across SSA and particularly Ghana, can be grouped into two: first, studies that examine the environmental dangers associated with the sector to create a general awareness (see Akabzaa, 2009; Antabe et al., 2017; Dooyema et al., 2012; Hilson et al., 2007; Nyanza et al., 2014; Shandro et al., 2009), and second, a few researches that elucidate community members perception on environmental repercussions of ASM activities (Armah et al., 2011; Lawson & Bentil, 2014). There is however a gap in knowledge of how the miners (considered the perpetrators in this case) perceive their contribution to the destruction of the environment or community through their engagement in the sector. These challenges stated in the literature are later used as a guide for interviews and focus group discussions to specifically reflect miners' knowledge and perceptions of these dangers.

2.4. Geography of Health

Geographical research on health and wellbeing commenced with the application of the biomedical approach in examining the spatial distribution of diseases across space and time. The biomedical model assesses disease as a deviation from a normal biological function or a universally recognized standard of balance in the human body (Dixon, 2014). The concept of

health however remains less understood with this model hence the transitioning from the biological definition to a more holistic determination of health through the field of health geography. Although a sub-discipline of medical geography, health geography distinguishes itself from medical geography by investigating the complex relationship between people, place and health.

Health geography incorporates a broader definition of health and wellbeing by proposing that there is an inextricably link between health and place. It proposes that the interaction between socio-cultural factors and the physical environment hinders or predisposes a target population to diseases (Gatrell & Elliott, 2014). As Kearns and Moon (2002) argue, health geography distances itself from concerns with disease and the interests of the medical world in favor of an increased interest in well-being and broader social models of health and health care. It emphasizes place constructed and experiential health outcomes by stressing the importance of *place* to health, ill-health and care (Gatrell & Elliot, 2009; Kearns & Moon, 2002). Generally, the sub-discipline acknowledges that variations in health behaviors and outcomes cannot be explained completely in terms of the characteristics of individuals, because place-specific features also have significant influence on health (Kwan, 2012). Place, however, as conceptualized by health geographers extends beyond mere sites or locations; but rather a complex cultural symbolic phenomenon constructed through relationships between people and their settings (Luginaah, 2009).

Geographies of health therefore moves from the positivist theoretical perspective (which adopts methods of natural science to study ‘causes’ or factors of health by relying on accurate statistical measurements and associations) to a social interactionist paradigm which emphasizes the importance of meaning of health to the individual, whiles the researcher’s task is to uncover or interpret the understandings and meanings that make it critical for the individual to act in a particular way (Gatrell, 2001). This research can be bracketed under the latter perspective as it

investigates the meanings youth miners attach to their health and the reactions to health complications. Kwan (2013) however cautions that health geography is broadened in nature and scope hence it has become too complex to be fully interpreted by a single perspective. Different theoretical and methodological perspectives are necessary in recent studies to enrich each other and enhance our understanding of health and wellbeing (Kwan, 2013).

In recognition of the subjective meanings and interpretations individuals and society alike attach to health, it is pertinent to further identify dangers and appraise their consequences on those who are likely to be affected. Accordingly, 'risk perception' emerges as a major component in analyzing the threats and dangers to peoples' health.

2.4.1. Risk Perception

The concept of risk is interdisciplinary as it expands from mathematics and economic decision-making into many disciplines in the social sciences including anthropology, sociology and psychology. According to Beck and Holzer, (2007; p.9) "risk is the possibility of future damage which can be attributed to a decision by a person, organization or society, whereas danger is the possibility of damage that is attributed to factors over which we have no control." Risk, therefore in simple terms, is the anticipation of the occurrence of danger and a possible damage based on the decision of individuals. This suggests that individuals for instance, can notice possible dangers to their health, place or community based on their decisions but have minimal control over the occurrence and consequences of these dangers when they happen. Therefore, how an individual perceives risk is influenced in part by the type of danger he/she is exposed to and the anticipated severity of that exposure. Perceptions therefore play a major role in motivating individuals to act to avoid, reduce, adapt to, or even ignore risks.

Risk perception is however not easily explainable (Sjöberg, 2000). Several disciplines in the social sciences therefore investigate and explain risk perceptions under varied themes. In psychology, risk perception analysis bases on the characteristics of the hazard and the subjectivity of individuals. Psychological risk perception research maintains the role of cognition, personal emotional appraisals of probability and consequence and issues of familiarity to reveal the subjective dimensions of individual's perceptions of risk. It assumes that there are no significant individual differences in terms of risk perception (Jackson et al., 2006; Rufat, 2015). This paradigm is however disapproved by sociologists and anthropologists who maintain that risks are socially and culturally constructed. Sociological studies critique the psychometric researches by claiming that the latter tend to itemize individuals and pay little attention to demographic characteristics (such as age, gender, ethnicity) of the study group, neglecting that risk perception constitutes a culturally complex and uneven social experience and conviction (Wilkinson, 2001; Wachinger et al., 2013). This idea holds in social geography which supports that social and cultural factors are important components of perceptions and acceptance of risks. An individual's agreement to or deny of being at risk are rooted in cultural beliefs which are transmitted by the social group which the individual is part of.

According to Rufat (2015), risk perception studies in geography dates to the 1960s when geographers including Burton and Kates (1964) and White (1964) carried out surveys to understand the public's attitude and behavior to extreme natural events such as flood scenarios; and the aims of such studies is developing and influencing public policy (Kates & Burton, 2008). Kasperson and Dow (1993) propose that the goal of risk or hazard research in geography is to explain differences in perceptions and responses to dangers, among individuals, cultures and societies. Geographical research on risk perception which originally focuses on understanding

human behavior in the face of natural hazards is however extending to include human-initiated hazards such as technological hazards as well and *place* is increasingly considered a determining factor in the difference in how individuals and societies perceive risk. In contemporary geography studies for instance, most research interests hinge on examining place-specific risk perceptions and exposure to hazards from industrial productions, nuclear plants and waste facilities to confirm the various perceptions people living near such facilities have (see Larock & Baxter, 2013; Venables et al., 2009). The ubiquity of risk and its prominence to human lives necessitates a sustained research effort to understand how people perceive risks.

The literature reflects a conceptual diversity in assessing individuals' risk and perceptions. The self-rated health (SRH) concept, the social amplification and attenuation framework and cultural theory among many others are developed to interrogate and measure subjective interpretations of perceived risks. The concept of risk perception in geography is however embedded in cultural ecology and environmental risk research, both of which are used to study how residents adjust to natural hazards (Baxter & Greenlaw, 2005). Cultural ecology, developed by Julian Steward in the 1950s is a theoretical perspective that examines human perceptions of the environment and explains that differing risk perceptions among people and their adaptation to the environment are dependent on distinct cultural biases and processes (Boholm, 2003; Rippl, 2002). However, as Brown (2014) suggests, risk perception is a personal process of decision making, based on the individual's frame of reference developed over a lifetime, among many other factors which determines the extent to which the perceived risk is mitigated. For this reason, this study purposefully considers individual (miner) experiences foremost.

2.5 Conclusion

The chapter begins with an overview of rural livelihoods in sub-Saharan Africa. It reveals that currently rural people are mostly engaged in farming activities but also diversify their livelihoods by engaging in the non-farm sector. Activities in both farm and non-farm sectors are complementary ways to income generation for the rural poor. For most rural households, produces from farming activities are scanty hence the need to engage in the non-farm sector for the maintenance of the household. Although the outcomes of this diversification are mixed, the current literature is skewed towards its relevance to rural people and its contribution towards poverty reduction. The review however suggests a new trend in livelihoods formation - individualized livelihood rather than co-operate household livelihood. Also, ASM is a growing non-farm sector for rural people especially the youth who are gradually disengaging in agricultural production. Youth are consistently engaging in mining activities albeit the dreadful health challenges associated with this form of livelihood. This review exposes the methodological gap in the knowledge of occupational and environmental perceptions of ASM miners. The next chapter details the methodological approach applied to achieve the objectives of this study.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter presents the methodological approach used to address the research objectives and questions, as well as on how the data were gathered. With a primary focus on youth involvement in Artisanal Small-Scale Mining (ASM), this study uses qualitative methods - semi-structured interviews and focus group discussions - to examine the motivations for their involvement in small-scale gold mining activities, perceptions of their occupational health, and consequences of their activities on the environment. The first section of this chapter deals with the research approach and design, followed by the selection of the study sample and a detailed description of the research sites. The data collection process and data analysis are described next. Finally, the chapter concludes with a summary of the overall methods of the study.

3.1 Research Approach and Design

The overarching objectives of this research are to obtain a greater understanding of the underlying motivations for youth engagement in ASM and their perceptions of occupational and environmental health outcomes. To achieve this, a qualitative approach is adopted for a number of reasons; a qualitative research is an appropriate method that allows an understanding of people's behaviors and their lived experiences (Creswell, 2013; Liamputtong & Haritavorn, 2014). Through a qualitative method, it is possible to capture the contexts within which the research sample interact with its social and physical environment as well as the meanings attached to the experience. As Jamshed (2014) reiterates, to understand human behavior and the meanings associated with the experience, qualitative research presents a broader spectrum for individuals to recount their

experience. Due to the expansion of ASM which has become a critical phenomenon in Ghana, qualitative approach is used in this study to obtain an in-depth understanding of youth miners' lived experience.

The second reason is that, in the extant literature, studies broadly focus on ASM as a livelihood strategy in rural areas and treat the participants in the sector as a homogenous group. There is a dearth in knowledge on youth miners' experiences especially, perceptions regarding the effects of their work on their personal health and the environment. According to Alvesson & Skoldberg (2009), qualitative approach facilitates the examination of cases with little prior knowledge. This approach is therefore applied to hear, unearth better, and understand the perceptions youth hold on their work and the numerous stories that help to create these perspectives. The qualitative approach provides detailed descriptions of youth miner's circumstances which help to better understand their perspectives. Finally, since this study seeks to understand *why* ASM activities have increased in the Upper East Region (UER), and *how* that contribute to or affect the livelihoods of participants and communities, using the qualitative approach allows the researcher to explore individual perceptions of reality rather than accepting one common version of reality (Creswell 2003; 2013). It further helps to expose some complexities associated with youth engagement in ASM work and the evolving changes in rural livelihoods.

Qualitative research offers five main approaches of inquiry; action research, grounded theory, case studies, phenomenology, ethnography, and historical or narrative research, and the selection of either of this approach to a study is dependent on the philosophical standpoint of the researcher (Creswell, 2007; Lewis, 2015). Considering that the goal of this research is to obtain an in-depth understanding of youth miners' experiences and the perceptions about their engagement in ASM, it is ideal to use the phenomenological approach. Phenomenology is a detailed descriptive

study of a situation or phenomenon through the interpretations of the accounts provided by people who have experienced this phenomenon (Nakayama, 1994; Wilson, 2015). In phenomenological research, an emphasis is placed on the personal perspectives and interpretation of the research participants. Even though these perspectives and experiences of the participants are subjective, obtaining such information helps the researcher to gain deeper insights into the participants` motivations and activities.

Prior to this study, the researcher familiarized with information on the expansion of ASM in Ghana through the local media, contacts with researchers who conduct studies on the topic and an initial literature review. The researcher however did not form any preconceived ideas from these information sources before the fieldwork in order to capture the different perspectives held by the study respondents on the ASM phenomenon in their communities and to avoid biases during the data collection stage (Wilson, 2015).

3.2 Study Communities

There is a large body of literature on ASM in Ghana, but most of them have concentrated on mining communities in the Southern Regions which have a longer history of ASM. Examples of these older mining towns include Obuasi, Konongo and Tarkwa in the Ashanti and Western Regions respectively (Armah et al., 2013; Andrews, 2015; Okoh, 2014). This study chooses to explore some of the relatively new mining communities in the country to capture and better understand some nuances in the experiences of ASM miners specifically within Ghana but which can be applied to the study of other similar situations across the sub-Saharan Region. The Upper East Region (UER) is thus selected because it has some of the newest mining communities, with ASM activities only dating to the 1990s compared to longstanding mining areas such as the Ashanti and Western Regions where commercial small-scale gold extraction activities is believed

to have commenced during the 19th century (Hayford et al., 2008). More so, literature searches prior to this research have shown that studies on the ASM sector in the UER have only began in the 2000s by authors such as Agyemang (2010) and Paruchuri et al., (2013). From an initial stage of searching and collecting raw gold nuggets from the deep forests, gold mining in the UER, has for the past two decades gradually advanced into a more sophisticated one with the introduction of mechanization and it has become a major source of livelihood for the people in the region.

The UER is one of the least populous regions in Ghana, although its population grew from 920,089 in 2000 to 1,046,545 in 2010. With a growth rate of 1.2% the population is anticipated to increase to about 2.8 million by 2040. Of the total population, about 48.4% are males, 41.5% under 15 years and 51.6% age 15-64. In terms of land size, the UER is also one of the two regions with a small land area (National Population Council, 2012). The region is predominantly rural with only 21% living in urban areas and majority of the population plagued with high levels of poverty (Ghana Statistical Services, 2012). The UER, again is largely agrarian although it records the highest temperatures, which exposes it to frequent droughts (Ministry of Food and Agriculture, 2011). The peak rainfall period is usually between August and early September with most of it occurring within the months of July to September. Periods of dry season usually last for about five to six months, from November to late March or early April (Agyemang, 2010). Average landholding for farming activities is also comparatively low. For instance, the average household land in the UER is 1.8 hectares compared to 3.0 hectares in the Upper West Region (Amanor-Boadu et al., 2015).

Meanwhile, ASM activities, in recent times are flourishing in the UER as people desperately struggle for their living. Two districts in the region – Talensi and Nabdam (which operated as a single district Talensi-Nabdam until 2006), feature massive gold extraction business.

Oral narrations from the field suggest that the ASM work started in Nabdam although presently, the work has expanded in Talensi. The study was thus conducted in the mineral-rich Talensi District which falls within the Birimanian, Tarkwanian and Voltarian rocks of Ghana (Ghana Districts, 2006). These rocks are noted for their high concentration of gold sediments and are classified as the major sources of gold and diamond in the country (Agyemang, 2010). The Talensi District is bordered to the North and South by the Bolgatanga Municipality, and the Mamprusi Districts respectively. To the West of Talensi is the Kassena-Nankan District and Nabdam to its East (Ghana Statistical Service, 2014). Talensi lies between latitude 10.15° and 10.60° North of the equator and longitude 0.31° and 10.5° West of the Greenwich Meridian (Ghana Statistical Service, 2014).

The District is home to about 81,000 people with males representing approximately half (50.3%) of the total population. Talensi, however, has a youthful population as 41% of the total population are between the ages of 15-30 (Ghana Statistical Service, 2014). It also has a large rural population (84%), with the majority engaged in agricultural production. Research report from the Talensi District Assembly suggests that about 90% of the people derive their livelihoods from agriculture. This notwithstanding, gold extraction and food processing are also key economic activities (Ghana Districts, 2006). The mineral advantage mentioned above, coupled with the ecological challenges and the high numbers of youth engaged in ASM in the District, highly contributed to the selection of this study area. Besides, of the few studies on ASM in the UER, cases from Nabdam dominate.

Three mining communities - YamSok, Gbane and Datuku - within the Talensi District are selected based on secondary data and oral referrals after initial contacts with the local people. In addition to this, preliminary field visits were made to a few communities to observe the extent of

youth engagement in ASM activities before the selection of these communities. Although these communities share similar social and geological characteristics, there are still significant distinctions in the mining processes utilized by the miners. YamSok is a rural community located about 13.67km away from the regional capital – Bolgatanga. There is a poor road network between these two areas, and the predominant mode of transportation is the use of a motorbike. There is also a sharp contrast in physical features such as housing and other infrastructure or social amenities situated in the regional capital and YamSok. For instance, mud houses and boreholes dominate in YamSok while residents in Bolga (as commonly called) access pipe-borne water and live in block houses. YamSok, Gbane and Datuku, like most of the communities within the Talensi District, predominantly practice small-holder agricultural production with farming systems like areas within the Sudan savannah agro-ecological zone (Ghana Statistical Services, 2014). Although most people in Yam-Sok, engage in farming activities, the area is hilly and rocky with very shallow soils, low in organic matter and coarse in texture. In fact, the soils are described by community members as ‘infertile’. In general, community members describe farm lands as scarce and by that, they infer the poor fertility levels of soils in the communities. Due to the poor soil characteristics, preparation for the farming season involve the making of terraces to conserve soil and water necessary for crops yield and to prevent erosions. Youth in YamSok engage in surface/dig and wash mining on family-owned uncultivated lands or leased lands from other community members.

Gbane and Datuku have similar ecological characteristics as YamSok although further away from Bolga. The distance from Bolga to Gbane and Datuku is approximately 23.1km and 23.8km, respectively. Mud houses with thatch roofs are also the dominant housing units in these communities and the few block houses with zinc roofing are owned by households considered

wealthy, while some serve as government provided shelters for public officers, health facilities and schools. In general, farming is a major activity for the people in Gbane and Datuku. Farming activities are undertaken on plots located close to the homes and miners move temporarily or permanently to mine further away from their homes and farms, although accounts from key informants reveal that mining activities have encroached on lands previously left fallow for crop cultivation. All the three study communities (YamSok, Gbane and Datuku) are heavily reliant on rain-fed crop cultivation albeit poor rainfall patterns typified by a shortened rainy season and a lengthened dry season. The crops produced are majorly maize and millet; with some households supplementing that with sorghum, beans and/or groundnuts and others too augment this with livestock production. This arrangement is necessary because staple crop production is mostly a non-cash livelihood-securing activity, thus rearing guinea fowls, chicken, goats, piglets and bullocks is a major source of cash inflow especially for households that do not engage in the non-farm sector. The women or young female household members also engage in the cultivation of a wide range of vegetables. The produce from these vegetable gardens provide the needed ingredients for the preparation of food for the family whilst monies from livestock sales are used to augment additional ingredients.

Gbane and Datuku communities host two sophisticated underground mining sites which are situated at the outskirts. These mining sites are named after popular towns in Southern Ghana; the mining site in Gbane, is named after a well-known market in the Ashanti Region - Kejetia and Datuku hosts Tarkwa and Obuasi mining sites, which are towns in the Western and Ashanti Regions respectively. The mining sites in these two communities are however situated close to each other which has caused previous researchers to lump them together (e.g. Paruchuri et al., 2013; Sulemana &Agyemang, 2015). This distinction is nevertheless clearly made through

narrations from participants during field work. One of the key informants in this study sample for instance gives out detailed demarcations of the various communities. Youth in Datuku practice both surface and underground mining although majority engage in the latter method, and in Gbane, only underground mining is carried out. The research communities ares illustrated in Figure 3.1 below:

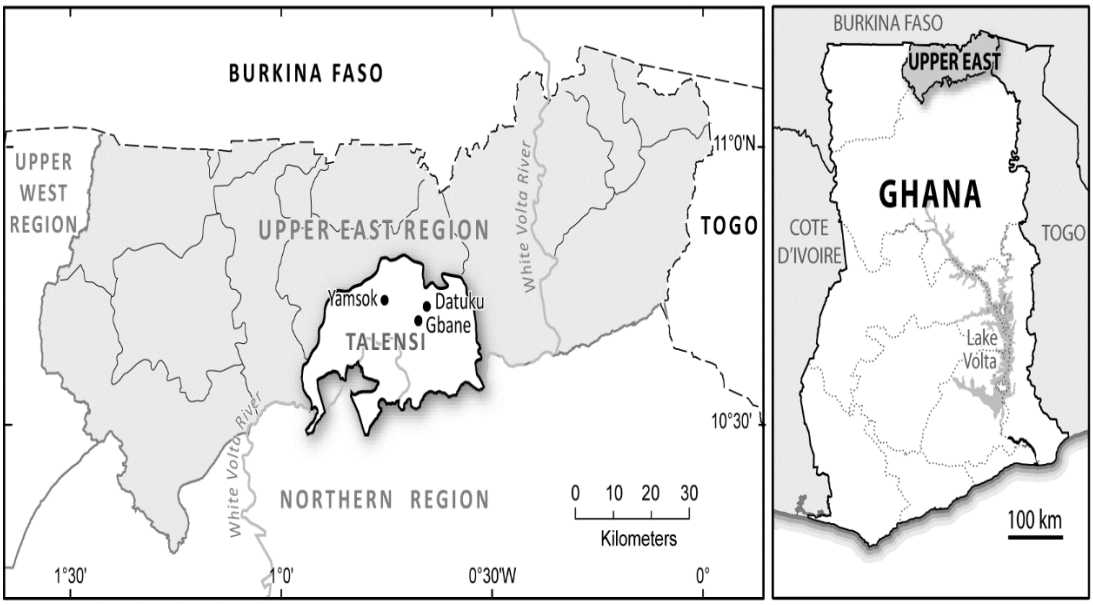

Figure 3.1: Map of study communities in the Upper East Region of Ghana

3.2.1. Accessing the field

Prior to data collection, a highly skilled local research assistant who was familiar and had contacts with the mining communities was recruited to assist with arranging the interviews and group discussions; all the interviews and group discussions were nonetheless, led by the researcher. The researcher and assistant first visited three mining communities within the Talensi District to meet with multiple gatekeepers and community leaders who were knowledgeable on ASM activities. During the meetings, the objectives and goals of the research were shared through open

and consensual negotiations with the gatekeepers to facilitate rapport building. The rapport building process was an important aspect of this research for the recruitment of a network of potential participants. As Molden (2011) argues, without understanding and trust between the researcher and participants, which is achieved through rapport building, the people under investigation can be sceptical and suspicious of the researcher.

3.3 Participant Selection

This study used purposeful sampling to recruit participants. Purposeful sampling is widely used in qualitative research when the researcher is aware of the actors involved in the phenomenon to be studied and ensures that the final sample is representative of these actors. The rationale for employing a purposeful strategy is that "the researcher assumes, based on his/her a-priori theoretical understanding of the topic being studied, certain categories of individuals may have a unique, different or important perspective on the phenomenon in question hence their presence in the sample should be ensured" (Robinson, 2014; p.32). Since this research is interested in youth miner cases, the purposeful sampling technique was used to identify this defined group of youth for thorough investigation. Some youth perceived the potential of the research to affect future deliberations and policies revolving the ASM sector; hence, they personally expressed their interests to participate. To them, participating in the study was a platform to express their views and being part of an anticipated positive effect was gratifying. This group of people still had to meet all eligibility criteria to be able to participate.

Other participants such as key informants consisting of ghetto owners/managers and traditional leaders were mostly referred by community members. This group of participants were recruited based on their depth of knowledge on the ASM business through direct or indirect

association with mining activities; and their participation were not limited by age. Ghetto owners/managers operating at underground mining camps for instance owned and/or managed portions of concessions (i.e. lands apportioned for mining activities) and employed the youth. Health workers and some government officers at the District Assembly were also sampled because of their positions and roles; which involve the provision of health care to youth miners and mining communities in general, and the regularization of mining activities respectively. This category of respondents was sampled because their accounts are considered relevant to achieving the goals of this study. Enormous care was taken in generating the sample that participated in this study to solicit the desired narratives on the phenomenon; and by extension contribute to the validity and reliability of the results presented.

3.3.1 Inclusion criteria

The inclusion criteria for this study was miners between the ages of 15-24, actively involved in ASM activities for at least six months prior to the data collection period, and live within the communities under investigation. The specified duration of employment was considered as an appropriate period because prior discussions with community leaders and some concessionaires (site managers) reveal that when youth spend six or more months at the mining camps, they become abreast with the business operations at these sites and are more likely to remain in the work. Youth miners who participated in the face-to-face interviews were excluded from the focus group discussions.

3.3.2. Recruitment process

With help from the local research assistant, youth engaged in surface mining were first contacted at their various work stations and during work hours. This was the best way to recruit the participants and afforded the researcher the opportunity to observe both the physical and social

environment within which ASM work takes place. The miners were typically welcoming as most showed their willingness to partake in the study. A few however enquired about the sponsor of the study; according to them a sponsorship portrayed the sponsor's interest in local peoples' lives which could lead to promoting the ASM sector or otherwise. After learning that this study is mainly academic, they were nonetheless optimistic that the results of an academic research could have positive impact on national policies. After introducing the researcher and assistant to the site leaders (whose leadership were often based on age), youth miners, together with the researcher sought permission from the leaders to hold interviews. Interviews were held immediately with miners available, but otherwise scheduled for later dates dependent on the participants' availability. Shelter was not provided at the surface mining sites so interviews were conducted under trees which were rest places for miners. These places were often few meters away from mining pits where other miners worked. Participants who lived close to their work areas however requested their interviews to be held in their homes. All interviews were conducted in a friendly manner and that helped the participants to give details of their experiences and information on their work.

Mining operations at the underground mining camps are more organized. Concessions are fragmented into portions and allotted to or owned by people referred to as ghetto managers. The ghetto managers provide shelters close to their mining pits, and employ the youth to work in the pits. The closeness of the shelters to each other give the camps the resemblance of a 'ghetto'. Because the underground youth miners are mostly managed by the ghetto owners, the researcher made initial contacts with the managers for permission to engage the youth in the study. The first ghetto manager approached was introduced to the researcher by an adult miner. This ghetto manager who holds the position of Secretary to the Small-scale Miners Association is familiar

with academic research and therefore welcomed the researcher and demanded that his workers provide the needed information to the researcher. Youth miners in the underground mining camps were often very busy with work which led to frequent rescheduling of interviews. Overall, youth miners expressed willingness and agreed to participate in the interviews, although a few of them preferred to engage in group discussions.

The community leaders, key informants, health workers, government officers and staff of non-governmental organizations (NGOs) were recruited through visits to their work places or homes (for the community leaders). Initial visits to the compounds of the traditional leaders were facilitated by the communities' elders who were also introduced to the researcher by youth miners. At the District Assembly office, interview appointments were booked after meeting with and introducing the research to the Planning Officer. Health workers were also very receptive after permission was granted by the Municipal Health Directorate to carry out the study. Once entry was gained and patterns of reciprocity were established as part of the recruitment process, the next phase of the research process, the data collection, began.

3.3.3 Study population

The study population consists of respondents with varied backgrounds in order to capture different narrations on the growth of the ASM sector and its related implications in the research area. Although this research focuses on youth miners' experiences, it is established in the literature that there are several stakeholders involved in ASM (Crawford et al., 2017; Nyame & Grant, 2014). The stakeholders comprise of: youth miners (n=45) consisting of 33 males and 12 females, 10 key informants (traditional/community leaders, concessionaires/ghetto managers, parents of youth miners), government officers (n=6), health workers (n=5) of public health facilities, private pharmacy attendants (n=2), and officers of NGOs (n=2). Prior to field work, it was anticipated that

given a high number of female participation in ASM (Lynas, 2015), recruiting young female miners for interviews would be easy. It was, however, difficult to recruit female youth miners to participate especially in the face-to-face interviews with most of those contacted refraining from disclosing information to the researcher. Dindia and Allen (1992) and Robinson (2014) aver that in qualitative research, women exhibit a 'female-bias' tendency; i.e. females recruited to participate in qualitative studies have a higher tendency towards self-disclosure. This assertion, nonetheless, does not hold in this study as evidenced by the sample. Silverman (2010) maintains during qualitative studies, practical realities on the grounds provides strong reasons for altering sample sizes; thus, a proposed sample of 20 youth miners was increased to 45. The increased sample size helped to obtain a more heterogeneous study population.

The traditional community leaders are also included as key informants because of their role in land ownership and access which positions them in the debates surrounding the propagation of ASM activities. In Ghana, mineral-rich lands are owned by the government, but community leaders are regarded as the custodians of land hence their eminent roles in the decisions on the accessibility and use of land (Amanor, 2008). This accepted customary arrangement justifies the inclusion of traditional leaders in the study population. Furthermore, the government officers at the District Assembly, Minerals Commission (MC) and the Environment Protection Agency (EPA) are also included due to their significant role in the mining sector.

Due to the limited health facilities in the communities, a total of five health workers comprising three charge nurses, one senior physician at the District Hospital and the director of the District Health Directorate are included in the sample. Two pharmacy operators are recruited during the study because initial interviews with youth miners reveal their role and relevance in the provision of health services to miners and communities at large. Finally, the NGO officers are

included because of the various roles their organizations play towards youth development and livelihood improvements in the UER. Table 3.1 provides an overview of the sample.

Table 3.1: Overview of Sample characteristics

Overview of Sample characteristics

Stakeholder	Method	Gender	No of participants	Total
Youth miners	Interview	Males	33	45
		Females	12	
	Focus group discussions (5)	Males	42	52
		Females	10	
Government officials	Interview	Males	4	6
		Females	2	
Health workers	Interview	Males	2	5
		Females	3	
Key informants	Interview	Males	6	10
		Females	4	
NGO staff	Interview	Males	2	2
		Females	0	
Drugstore operators	Interview	Males	0	2
		Females	2	

3.4 Data collection

In this study, two qualitative methods – face-to-face semi-structured interviews and focus group discussions were used to collect data. These methods were used to allow for in-depth investigation into the debates surrounding ASM which has become a critical topic in Ghana. The data gathering process started with a visit to the study area in the summers of 2015 and 2016. The first phase of the data collection was conducted between June and September 2015 and the second phase, June to July 2016. During the first phase of field work, 39 interviews involving youths (n=30), key informants (n=6), and government officers (n=3) were conducted. Two (2) focus group discussions consisting of males were also held. A follow-up field work which formed the second

phase of the study was conducted during the summer of 2016. This was targeted at health workers and youth especially the female miners whose narrations are necessary for an enriched data on the phenomenon. During this final phase, 31 more interviews with youth (n=15), key informants (n=4), government officers (n=3), health workers (n=5), pharmacy operators (n=2) and NGO officers (n=2); and three (3) focus group discussions were conducted to supplement the previous data. All focus group discussions held consisted of only youth miners. It was during the follow-up that seven (7) of the total females interviewed in this study were recruited. Also, of the three group discussions held during this time, two comprised a female-only group. The follow-up interviews play major roles; first they expand on the recurrent themes gathered during the first phase. For instance, during the first phase, most youth participants attributed their engagement in ASM solely to poverty; but during the second phase, youth revealed the availability and 'easy access' to gold in their communities as prime reasons too. Second, it allows for the recruitment of equally important participants such as NGO officers and pharmacy operators as part of the study sample. This group of respondents provided additional information on the proliferation of ASM in the District as well as some concerns they have regarding youth involvement in the gold work. Overall, the first set of interviews and the follow-up data helped to develop a deeper understanding of the issues surrounding the rise in ASM activities in the UER.

3.4.1. Semi-structured Interviews

One of the most common means of data collection in qualitative research is interviewing and this method is used because interviews are particularly appropriate means of collecting detailed information on personal experiences, opinions and perceptions that people hold about their circumstances and the motivations for their actions (Gill et al., 2008; Jamshed, 2014). As Seidman (2013) argues, interviews are relevant for researchers interested in other peoples' stories

as these stories are ways the researcher obtains informed knowledge on the participants. At the root of interviews is an interest in understanding the lived experiences of individuals and the meaning these individuals make of their experiences (Seidman, 2013). During interviews, participants can share their involvement in the phenomenon under study through the stories recounted to provide insights into the researched problem. In this study, the researcher envisaged that youth miners may have context-specific and personal cases which can be best shared using face-to-face interviews. A youth miner, for example, could conceal pertinent information when put in a group discussion as s/he is likely to consider the group participation as an evasion of his/her privacy. The interviews conducted were particularly useful for a deeper exploration of the views of participants on the research problem.

Interviews were conducted in English and two common local languages (Guruni and Twi) in the study area. Interviews with government officials and health workers were conducted in English whilst youth miners' interviews were in the local languages. The researcher and the assistant were fluent in both languages and therefore did not require an interpreter. Interviews and focus group discussions were conducted at the mining sites to afford the researcher the opportunity to observe the *'business'* of the youth as they worked and also allowed flexibility in scheduling interviews with respondents. Overall, interviews with the respondents lasted between 45-80 minutes.

Semi-structured interviews guided by an open-ended questionnaire (see Appendix E) was used to encourage participants to reflect on and narrate their lived experiences. This format ensured that participants do not skew to unsolicited topics while allowing the respondents the freedom to express their views in their own terms. A few deviations were only permitted when they assisted to pursue an idea or provide detailed response (Gill et al., 2008). An advantage of using an

interview guide is that it increases the comprehensiveness of the data and makes the data collection process more systematic for each respondent (Opdenakker, 2006). During the interviews, the guide provided the researcher the ability to probe further into certain topics raised during the interactions. The youth miners were asked to share their experiences in engaging in ASM, the challenges they face with local traditional leaders and government, and the perception of the health risks associated with working in the mining sector. In addition, community leaders provided details on livelihood strategies available for the youth in their respective communities, the general perspectives on the growth of ASM and specific environmental consequences of the mining activities within the communities. The health workers were interviewed on the occupational and communal health effects of ASM; specifically, the general health status in the communities, common ailments reported by youth miners and their responses to treatment and other health concerns. All the interviews and focus group discussions were audio recorded. Recording the interviews and discussions reduced the time for extensive note-taking even though notes on non-verbal gestures, physical settings were also taken to supplement the recorded voices. These notes helped to draw out nuances in the emerging theme patterns which contributed to form better interpretations of the stories narrated by the respondents during the in-depth investigation, and that also contribute to a more robust analysis of the data (Locke, 2001; Muswazi & Nhamo, 2013).

3.4.2 Focus Group Discussions

A focus group discussion (FGD) is another major method of data collection in qualitative research which allows interviewing a group at the same time. To augment the face-to-face interviews, five FGDs were organized to solicit *'collective'* views on the beliefs, opinions and challenges they encounter within their work environment. Three sessions were held at YamSok community and the others at Gbane and Datuku communities, each group consisting of 8-10 youth

miners with sessions lasting between 60-90 minutes. The first two of the sessions were held in September 2015 and the remainder during the follow-up visit in July 2016.

Liamputtong (2011) suggests that the focus group should consist of individuals with shared experience and from similar social and cultural background. These group characteristics were considered during the formation of the groups for this study: first, the groups consisted of miners and their team leaders who shared similar work experience and second, they had comparable characteristics such as gender and age. In the study context, customary norms revolving gender issues are highly evident in the social interactions among male and female youth miners hence this affected the formation and make-up of groups. It is customary that females withhold their opinions in the company of their male counterparts during deliberations; for this reason, the sessions were held separately among the genders - four male and one female group. To facilitate open discussions, the researcher ensured a comfortable environment for each of the groups by holding discussions at suggested venues and providing light refreshment. Participants were grouped by age (15-17 years and 18-24years); the female group consisted of individuals between 15-17 years and only one of the male groups consisted of this age category.

For consistency, the same questionnaire guide from the interviews was used during the focus group discussions. Topics covered during the discussions included their motivations for engaging in ASM, views on personal health and safety, and the implications of the work on their communities. In general, there was consensus among the participants during the discussions although there were few instances of a lack of consensus on certain subject matter. Differing opinions in a group is expected which adds important value to the data as it allows opportunity for greater discussion and interpretations of participants' perspectives and experiences (Grønkjær et al., 2011).

3.5 Data Analysis

The data analysis process started at the data collection stage, with interviews transcribed immediately they were completed. This provided the research team an opportunity to critique and improve upon the interview process by revising the semi-structured questions in subsequent interviews where needed. All interviews, field notes and the focus group discussions were transcribed and printed into hardcopies. The transcripts were perused repeatedly to familiarize with the data by obtaining a general sense of participants' responses and identify emerging themes. Reading through the transcribed data helped to have a comprehensive understanding of the themes whiles uncovering the similarities and differences in the miners' experiences. Since this study aims to provide an interpretive report on the participants' behavior and experiences, and literature on the subject matter exits, the approach to the data analysis is deductive. The deductive approach to data analysis is necessary for understanding a research context in which literature exists although there is a gap in empirical studies on the subject matter (McMillan, 2009).

3.5.1 Coding

Coding is one of the important steps taken during the data analysis process which helps to organize and make sense of the textual data – both interview and field notes transcripts – gathered by the researcher (Basit, 2003). In qualitative research, two main coding techniques are used - manual coding and electronic coding, which involves the use of computer programs. In this study, transcripts were manually coded to avoid 'distancing the researcher from the data' which often happens when a computer program is used which encourages quantitative analysis of qualitative data (Welsh, 2002). The manual coding technique helped to familiarize with the data which led to developing numerous key words (codes) such as 'poor', 'unemployment', 'difficult', 'health', 'reclaim' and 'school' from the participants' responses to help categorize and analyze the data.

The coding process was performed in phases to capture the diversity and commonness in responses across the data. At the start of coding process, a record of codes was made in the margins of the hardcopy transcripts with coloured pens and the text highlighted with a marker. To ensure consistency across the codes generated, all the transcripts were compared with each other to search for texts that conveyed same meanings to be assigned the same codes. Where new ideas are presented in the texts, a new code is recorded and this process continued until all the transcripts were coded. This procedure facilitated the sorting and categorization process which produced a first set of innumerable codes, and that necessitated the second phase of coding. In the second stage, the initial codes were grouped into *'anchor codes'* – a set of codes assigned to texts that answer the research question. These codes revealed a pattern of shared perceptions and motivating factors which was further translated into themes and sub-themes. Individual themes were analyzed to demonstrate how they contribute to the interpretations of the participants' experiences.

In the results chapters, specific quotes are selected to support the themes that emerged from the data analysis. Participants' quotations do not only provide important representations of the themes that emerged but also help to understand some nuances of meaning in the local language used to conduct the interviews and focus group discussions. As Baxter and Eyles (1997, p.508) propose, verbatim quotations are important for "revealing how meanings are expressed in the respondents' own words rather than the words of the researcher". Also, quotations of individual participants within the focus groups are used to reflect group interactions as well as a representation of common views held by respondents. These quotes are however identified with participants' age and job titles to maintain confidentiality and anonymity of the participants. Given that qualitative studies require participants to disclose personal information, breaching the confidentiality clause is of high importance in this research (Kaiser, 2006).

3.5.2 Saturation

Saturation is the point at which the data no longer offers new or relevant information; and that is dependent on factors such as the composition (homogenous or heterogeneous) of the sample, and the theoretical approach utilized by the researcher to obtain in-depth understanding of the topic (Dworkin, 2012). In qualitative studies, there is a lack of consensus on the *'right sample size'* to achieve saturation; for grounded theory research, most researchers recommend 25-30 participants as minimum sample size required to reach saturation while phenomenological researches are conducted with comparatively small sample sizes – below 20 participants. This recommendation is made for phenomenological researches due to the detailed description of the perceptions and understandings of the research group provided. The rather large sample in this study consist of a heterogeneous group of participants who responded to the same set of interview questions which helped to obtain diverse responses from participants until the information did not provide fresh insights into the phenomenon.

3.6 Qualitative Rigor and Validity

Steps were taken to achieve thorough and exhaustive results that can be replicable to studies on other aspects of individuals` experiences in the ASM sector. In qualitative research, it is expected that the study outcomes are valid - it should be an accurate representation of the phenomenon that is understudied (Long & Johnson, 2000), and credible, and this is achieved through a rigorous data collection process and analysis (McMillan, 2009). Rigor is one of the important elements of a qualitative research although its definition remains varied among various authors. According to Baxter and Eyles (1997) rigor can be broadly understood among social geographers in terms of credibility, transferability, dependability and confirmability. To establish

rigor in a qualitative study, Baxter and Eyles (1997) propose a checklist of strategies that include: the use of multiple data collection techniques, a detailed description of the respondents sampled for the study, the use of verbatim quotations to serve as low inference descriptors and member checking. This checklist served as a guide while conducting this study. First, a rigorous data collection process was applied to obtain detailed accounts of respondents, and the in-depth description of the physical characteristics of the research sites. The use of the multiple data collection techniques – interviews, group discussions and comprehensive note-taking – assisted in making the data credible as data was triangulated to attain diverse narratives on the research topic. As Baxter and Eyles (1997) suggest, the use of multiple and complementary methods increases the rigor of a study and strengthens its credibility. Second, to establish rigor, prior to the start of this study, the sample was well-defined which helped to carefully recruit the respondents to obtain reliable findings. It is recognized that including ineligible individuals or people who are not in any way engaged in roles related to the phenomenon jeopardizes the credibility of the study (Eldredge et al., 2014). Also, during the data analysis process and results presentation, quotations of respondents are used to contextualize the responses while allowing for the participants' *voices* in the interpretations. Finally, member checking, also known as respondent validation, was done during the second phase of the fieldwork to help improve the credibility and validity of the data. During this period, some respondents in the interviews conducted in the first phase were revisited to verify their responses and the interpretations assigned to them. This respondent verification process was relevant as that allowed the participants to check for accuracy in the record of their experiences shared with the researcher.

At every stage of the data collection process, though, validity of data was also tested by comparing and locating the discrepancies in participants' responses. During the interviews

sessions for instance, when the first youth miner interviewed mentioned poverty as the principal reason for engaging in the ASM work, this was tested by enquiring the influence of poverty on other participants' engagement in mining in the subsequent interviews. Also, because the same interview guide was used for the group discussions, it facilitated the opportunity to further validate youth miner responses. Narrations from the other stakeholders such as the key informants and health workers were also scrutinized for consistencies or variances with the responses provided by the youth miners.

3.7 Ethical Considerations

Prior to the study, ethical approval was obtained from the University of Western Ontario, Non-Medical Research Ethics Board. In Ghana, study approval was granted by the Talensi District Assembly and the Municipal Health Directorate in the UER. In addition, informed consent was obtained from all the participants after providing detailed explanation of the study objectives, the methods, anticipated length of time for interviews and group discussions, the nature of questions, and their role. Two respondents – a key informant and one pharmacy operator, expressed their willingness to participate in the study but refused to sign the consent form because that was interpreted as 'too binding and restrictive'. Instead, they provided verbal consent and were allowed to participate in the study due to the relevance of their accounts to the data. However, it was mandatory that participants under the age of 18 provide consent from parents or guardians. To ensure confidentiality and freedom of expression, participants were informed of their ability to withdraw from the study at any given time without any threat to their employment status. (Refer to Appendices A to C for ethics approval and consent forms). There were no known risks associated with participating in the study. Also, all data collected are electronically stored on the

personal computer of the researcher, and a backup provided on an external hard drive which limits accessibility by a third party. The data is again stored in a password-protected folder on the University computing system which is accessed only by the researcher.

3.8 Conclusion

The chapter provides a detailed description of the methodological approach and data analysis techniques used in this study. For the data collection process, in-depth report is given on the methods used to unearth deep meanings of the experiences of youth miners and other participants including government officers, health workers and key informants who are recruited into the sample because of their key roles in the mining sector. Majorly, respondents provided detailed accounts and narratives regarding their direct involvement in ASM, interactions between miners and local leaders, provision and access to health care and implications of ASM on the environment through face-to-face semi-structured interviews and focus group discussions; and this facilitated a better analysis of youth miners lived experiences. Themes emerging from the transcripts represent the results of the study which are presented in the next three chapters.

CHAPTER FOUR

MOTIVATIONS FOR YOUTH ENGAGEMENT IN ARTISANAL AND SMALL-SCALE MINING

4.0 Introduction

Although artisanal and small-scale mining (ASM) is not a new phenomenon in Ghana, there has been a dramatic surge in the number of young people engaging in this activity. Consequently, ASM has become a great concern for local and national governments, host communities and the public as a whole. In this chapter, I present some of the reasons behind the growing participation of young people using examples from the Upper East Region. Three factors emerge as the main drivers for youth participation in ASM. Poverty, lack of alternative opportunities and geographic proximity are the most recurrent themes and study participants identify these as the most important factors driving their engagement in ASM. The section uses the experiences of youth in ASM to illustrate how the various social and economic challenges participants face serve us underlying factors for engaging in ASM. By presenting the prime motivations for engagement in ASM, this chapter also provides a contextual background for understanding the other key findings presented in subsequent chapters.

4.1 Poverty as catalyst for ASM participation

4.1.1 Pervasiveness of poverty in communities

Among the three factors which are identified as important for engaging in ASM, poverty is the most dominant and recurrent theme in participants' discussions. A wide range of examples are used to demonstrate how poverty influence the decision to engage in ASM. From the many examples, participants' discussions on poverty as the primary reason for ASM engagement can be categorized into experiences and perceptions of poverty at three levels; community, household and

individual. There is consensus in the narratives of all participants that poverty is endemic in their communities. This is aptly captured by the following from a participant in response to a question on why he and other youth from his community participate in ASM: "we are surrounded by poverty. So we engage in galamsey". It is noteworthy that stories of high poverty incidence at the community level usually centred on over reliance on agriculture for decades – which participants argue have not improved livelihoods and standards of living. This is illustrated in the following quote:

> In my hometown, everyone is a farmer. Our ancestors were all farmers and had always relied on the soil to live. There is no rich person in my village. We have been farming all these years and everyone remains poor…so it is time to try something else to see if the situation will change. That is why we are in galamsey.

The above sentiment suggests that young people are willing to try alternative means of livelihoods because agriculture has not alleviated their poverty situation. Some participants attribute this situation to declining agriculture production which they indicate further worsens poverty in their communities. This point is emphasized by a youth in his early 20s who recently abandoned farming to pursue ASM:

> Farmers in the village are poor because the soils are not fertile and we get nothing for all the hard work we put in. The rains have also stopped coming so some of us have stopped [farming]...Even though farmers were not rich when I was a young boy, they could feed their families all year round and still have some food to sell for cash on the market in case of any emergency.

Discussions about the unsustainability of agriculture as a source of livelihood in communities are usually accompanied by narrations of how helpless and desperate many households have become in recent years. The poverty situation at the broader community level and lack of alternatives is also re-echoed by a government officer who indicates the following:

> The problem here is that, like the other two districts in northern Ghana where I have worked, people here do not have options in other sectors where they can find employment apart from farming. Because most people in the community are poor, galamsey presents an easy opportunity for youth in the community to find work. It is not surprising that almost every household now has someone working in galamsey pits.

This comment by the district planner is a noteworthy commentary on the state of (under)development and the nonexistent opportunities beyond agriculture and ASM. It is evident that for most youth in the community who are seeking employment, ASM presents a viable avenue to meeting their immediate necessities of life.

4.1.2 Poverty at the household level

Most of the discussions on how poverty serve as driver for participation in ASM come from illustrations of dire situations at the household level. This suggests that poverty at the household level influence the decision to participate in ASM — a situation study participants hoped they can contribute to improve. The commonest illustration of how poverty at the household level is responsible for the surge in ASM relates to food security. Most participants indicate that it has become increasingly difficult to feed their families in the absence of a reliable income:

> I did not have any money to buy food whenever there was none at home. I joined galamsey because I was tired of seeing my wife, young son and the rest of my siblings go to bed hungry many nights. At least here, if I keep working hard, my family will not go to bed hungry again.

Household food insecurity is a growing problem in the region (Quaye, 2008) and this results in a situation where peasantry in many communities is now associated with complex survival and livelihoods diversification strategies (Yaro, 2002). In the last few years, the discovery of gold resources in some of these poor communities is providing another option for residents to improve their household food insecurity.

It is interesting to note that many young participants indicate they have to assume the responsibility of providing food for their households due to the inability of their parents to do so. The youth engage in ASM to supplement the food needs of their households. Some of the study respondents indicate that their parents' inability to provide the needs of their households is because of frailty associated with old age and low human capital, due to lack of formal education, which limits their ability to seek alternative employment opportunities.

> My parents are now very old and weak. At their age they do not have the energy to engage in activities which require the use of physical strength…unfortunately, my parents did not have formal education so now that their strength is failing them, they cannot farm large pieces of land and they have no money coming to them.

Consequently, a combination of decreasing household income and increasing need for such incomes to sustain households influence the youth to engage in ASM. The lack of a constant flow of income result in a situation where many youth in household have to engage in economic activities to support their families. A male participant examines this responsibility he has towards meeting the food needs of his family;

> Madam, as I sit here with you, I have five younger siblings and since my parents do not earn enough, I use the money I get from the galamsey to support my mother so she can get some food for the family. Even though I am a young boy, I must provide food for my family. What can I do about that? I need to help my parents.

Many young participants indicate that they have been contributing to the upkeep of their households long before they turned 18 years through income generated from their involvement in ASM. Contributing to their respective households by providing financial resources to meet food and health care needs before adulthood has become necessary because most parents do not have reliable jobs that can support their large families. An interview with one of the government officers further elaborate on how dynamics within large families influence increasing youth participation

in ASM. The District Planner provides some explanation for the large family sizes in the district and indicates that the economic activities of young people, particularly those engaged in ASM, is an indispensable part of household livelihood diversification strategy.

> Many families just have too many children! People in this district and the surrounding areas marry at very early age and immediately start giving birth to children. So they end up having many children and have difficulties taking care of all of them. Therefore, their children step in to help provide basic needs for the household. At a very young age, they engage in some form of work otherwise they themselves will starve to death. At the moment, galamsey is the most common activity the young people engage in.

Although all the categories of people interviewed for this study, including the youth who engage in ASM recognize the importance of ASM participation as a household livelihood strategy, they acknowledge that it has negative consequences for educational attainments. Yet, due to the persistence of household poverty, many tend to ignore the long term negative consequences of ASM on educational attainment of children. This situation emphasizes the role of ASM as survival strategy.

Among the study participants, household poverty as a determinant of ASM participation is more forcefully argued by the relatively younger participants between the ages of 15 and 20. For them, the inability of their parents to meet their needs and that of their siblings influence them to take certain life changing decisions — which impact their education. For instance, an 18year old with 5years experience in ASM dropped out of school when he was 12 years. He indicates that he dropped out because his parents are too poor to pay for his education.

> I am the eldest of five children. I stopped going to school because my father was struggling to pay for my fees and that of my other siblings. I use some of the money I earn here to support some of my brothers who are still in school. My father does not have money to take care of all of us.

Although participants indicate that their parents are generally supportive of their education and wished their children could stay in school, the inability to provide financial resources push many to truncate their education. For example, another teenager who recently dropped out of senior high school recounts his frustrations about how the lack of parental financial support influenced him to drop out.

> The school always sent me away because of unpaid fees. I was tired of asking my father for school fees and money for other school needs. My mother doesn't work and my father is a retired security man who receives a monthly benefit of GHC200; and there are eight of us [children]. I often followed him in vain to collect money from him. It is because he doesn't have it. I had to leave school to do this work.

In addition to the ability of parents to provide school fees and maintain their children in school, many participants also associate their decision to drop-out of school with food insecurity. A participant recounts how certain household challenges including unavailability of food compelled him to abandon his education and indicates that the experience is the same for many of his colleagues.

> I have worked here for nearly 10 years. You would question why I did not go to school…I lost my parents at a very early age. Madam, I went to bed hungry many times and all that difficulty at that young age was unbearable. So, I dropped out of school and came here to work for my brother as a grinding machine operator. Most of the boys you see doing this work here don't even have food to eat in the house so they go to school and can't concentrate.

In some cases the youth try to balance their quest to satisfy their food needs with the desire to obtain an education. However, this proved to be challenging for most and resulted in eventual drop-out from school to work fulltime in ASM. This is illustrated by an 18 year old who recently dropped out of school:

> When I first came to work here 6 years ago, I was still attending JHS. I came to work here to support my family with money for food. I used to work here everyday after school and on weekends. Because I was no longer getting

> enough time to rest and study after school, I was repeated in JHS2 and this discouraged me from continuing. So I just left the school and I now concentrate on this work.

It is important to note that all the participants who indicate they had dropped out of school acknowledge the importance of education and some expressed the desire and hope of returning to school in the future. It is therefore not surprising that study participants who themselves have no formal education or dropped out due to poverty were keen at ensuring that their children did not end up digging for gold with them in the dusty pits. For example, a young mother of two with 12 years of experience in ASM, told the story of how her son needed to eat to enable him concentrate in school:

> As for the motivations to do galamsey, they are so many; but most importantly, when you stay home, how do you get money for your child when he is going to school? Even if the child is serious about school and decides to go to school hungry in the mornings, when he returns after 3pm, you should have some food at home for him, otherwise he will find it difficult to concentrate in school. I did not attend school but I want my children to go to school and be better than me in future.

A school drop-out, who is the breadwinner for his four younger siblings and his own young family of two children expressed similar concerns;

> …. I joined the guys at the mining site so I could provide for my family. As the first born of five children and the only boy, I am expected to take care of my sisters. Now if I don't work hard, there will be no food in the house for my family because my wife is currently not working; she is at home taking care of our children. I don't want my sisters to ever have to choose between going to school and coming to work here.

4.1.3 Pursuit of Individual Riches

In addition to illustrations of how poverty at the community and household levels serve as incentives for participants to engage in ASM, the lure of a fast route to accumulating individual

wealth also influence the decision to dig for gold. In an interview with a key informant, he indicates that the pervasiveness of poverty within the district creates a situation where every young person dreams of instantaneous riches through participation in ASM:

> Just talk to young people here and many of them will tell you they hope to make some fast cash by selling gold from their galamsey activities. You can't blame them for having those thoughts because realistically, it is the most promising opportunity around here.

The above sentiment is re-echoed by many participants in the study who indicate they are confident of hitting some kind of jackpot from their digs. Probing further, respondents reveal that only few people are able to make substantial amounts of money which enable them quit ASM. Respondents often expressed that hard work and persistence are necessary for making that hopeful breakthrough which will allow them to achieve their dreams as illustrated in the following statement by a participant:

> I have found some gold and made money. But it is not enough for me to return home and quit doing this job. I will keep digging and hopefully I will make enough money soon and establish my own business.

The intention to move on to other opportunities reemphasize that for some participants, ASM is a means through which they aspire to obtain their desired economic goals. These views seemed to conflict with certain opinions which suggest that the intention to contribute to household upkeep is the overriding reason for engaging in ASM. However, respondents clarified that although contributing to household needs is important, achieving a certain level of individual wealth would ensure they do not lack the ability to provide for their immediate families in the future:

> I hope to get rich from this galamsey business. That way I can have a good life and provide for my family. If my parents were rich, I wouldn't have to

> do this work. So I am doing this work because I want to get rich for myself and also help my brothers.

This demonstrates that the poverty argument as a driver of ASM involvement operates at different but interconnected levels. As such, respondents' decisions are driven by several multi-layered considerations. Yet, in the desire to be rich through ASM, participants indicate that they are confronted with some obstacles which make their aspirations a hard target to reach. From the interviews, an overwhelming majority of respondents indicate that the biggest obstacle in their attempt to be rich are concession owners who employ their services. According to participants, these concessionaires are exploitative and take advantage of their vulnerable situation or their desire to earn a decent living:

> We work many hours and when we find the gold, the owner of the concession takes it. When the prices of gold goes up, we do not benefit because they [concessionaires] tell us our positions can be taken by others who are willing to work. So we can't complain. Even though this is better than not having any work, I don't know if I will ever get a lot of money.

Some participants even expressed anger and resentment towards concessionaires. According to these participants, concessionaires have no regard for their health and wellbeing but only cared about their weekly gold targets from the pits they own. One participant put it this way:

> Since I started doing galamsey, I have worked for two concession owners. Now, I don't want to have anything to do with such people because they make you work like an animal and they are very greedy people. I work on my own with a few boys. We don't get weekly pay, but this way when we find a lot of gold we will be rich.

The negative relationship with concession owners results in situations where some ASM operators risk their lives to encroach on unassigned mineral rich lands.

Contrary to the above negative sentiments towards concessionaires, a few participants indicate that engagement in galamsey would be impossible without the money and equipment of

the concession owners. According to these participants, concessionaires are businessmen and therefore are interested in recouping their investment capital. This is summed up by a participant who has been working in ASM for about 15 years with the same concessionaire:

> When I started working here, I thought my boss was only interested in what he makes. Now that I understand this galamsey business, I know this work opportunity would not exist for me without my boss investing a lot of money on equipment and other materials we use. It is only fair for him to want to recover his investment.

Some respondents also indicate that they are concerned that they will not always remain physically strong to engage in economic activities which require extensive use of their bodies. For such people, getting rich while in the peak of their youth would enable them to transition into other economic activities.

> I can't dig for gold all my life. Just like my father who can no longer farm, I know that one day I will not have strength for this work. That is why I am working hard to make a lot of money. When I make enough money I can quit this job and do something else which will not kill me or make me sick.

This view indicates that participants recognize that ASM is not a livelihood strategy on which they can depend for many years. It also demonstrates that ASM participants recognize the potential health challenges associated with ASM.

4.2 Contextualizing lack of alternative employment opportunities

The importance of this theme in the findings is demonstrated by its recurrence in the interviews. In almost every interview, respondents who work as artisanal miners indicate that there are no job opportunities in their communities. Respondents indicate that among many young people within their communities the willingness to be employed is not matched by an equal availability of opportunities. For respondents, this is a critical motivation for engaging in ASM. This view is aptly summed up by a respondent who in reply to a probe on why an overwhelming number of youth participate in ASM:

> We only have the galamsey here, there is no other work. Nothing! Madam, you look around and see for yourself if there is some work here.

Some respondents indicate that the situation is not any different in Bolgatanga, the administrative capital of the Upper East Region, which for many years was a place where young people from various communities sort employment opportunities. A respondent illustrates this point as follows:

> These days there are no jobs anywhere. Work is scarce even in Bolgatanga. I tried to find work there and when I did not find any, I started a business there but that also failed. I had no choice but to come back to my village. At least here, I can do galamsey.

The above illustration speaks to a broader problem of limited economic opportunities within the entire region. Regional capitals, including Bolgatanga, have provided important sources of employment for many people from adjourning villages and smaller towns seeking such opportunities for years. The declining trend of employment opportunities is attributed to increasing emphasis on mining relative to other sectors such as tourism and manufacturing which have better potential for creating higher financially rewarding employment (Aryeetey & Baah-Boateng, 2007).

The absence of employment opportunities in other sectors is re-echoed by a key informant who decried the appalling nature of this situation for the overall development of the region and particularly the research communities. He had the following to say:

> There is nothing here. Show me a factory at Bolga that can employ these youth. That is the administrative capital of the region but it has nothing substantial to offer the many young people in the surrounding villages. Where are the jobs for the youth to do? There are none! If there were, I am sure they would find themselves something to do. They do the galamasey so they are not tempted to steal or do something bad. That is a better option for most of them.

These sentiments expressed by both key informants, government officers and interview participants engaged in ASM prompted me to probe further about any other existing sources of employment within the study communities. This produced some interesting perspectives about the broader context of employment opportunities in the UER. It is important to note that although respondents allude to the existence of other economic activities, they indicate that relative to ASM, opportunities for engaging in these alternatives were limited. Based on thematic recurrence on discussions about alternatives to ASM, three sub-themes are noteworthy: gendered alternative opportunities, accessibility barriers to apprenticeship in other sectors, and finally low entry requirement for ASM vis-à-vis the promise of high reward relative to alternative economic activities.

4.2.1 Gendered alternative opportunities

There is a clear gender differences in alternatives employment opportunities when respondents are asked to indicate other economic activities that could be available to them other than ASM. While female respondents usually list hairdressing, housekeeping and food vending as potential alternative employment, their male counterparts usually list construction related occupations such as carpentry and masonry as well as mechanic. The responses from participants who are currently working in ASM demonstrates the existence of strict gendered division of labor which is usually associated with many developing societies. Further probes on this gender division of labor showed consensus in all interview responses and some participants explain why this is the case as exemplified in the following quote:

> Men and women have different strengths so we do different work to help each other. Even here in the galamsey business, we don't allow women to go underground. Women and children fetch the water for washing the soil to get the gold.

Few participants, however, indicate they would not be concerned if the available alternative did not conform to existing gender division of labor norms. In this regard, one of the youth participants had the following to say:

> It doesn't matter to me if I am doing some work and everyone thinks it is women's work. If I can earn money from it and use it to help my family, I will do it.

It emerges that there is a hierarchy in the alternative employment desirability. Thus, besides the aforementioned, lesser desirable alternatives include 'truck pushing', head porting and dish washing. It is interesting to note the persistence of gender in the lesser desirable alternatives. For instance, a respondent notes the absence of opportunities for his desired alternative employment in the following quote:

> Bolga used to be a good place to learn how to become a mason but now you can't find spots. So now, the only work you can get apart from the galamsey we have here as a boy is truck pushing or driver's mate. And the girls too can wash bowls for the food sellers.

Female participants feel that they are more disadvantaged relative to men in terms of alternative economic opportunities. A female respondent who has completed JHS laments about limited opportunities to engage in other economic activities for girls who want to stay in their local communities after completion of school. She has the following to say about the situation:

> As a girl, the only other things I could do is hairdressing or dressmaking… that is a woman's job; or I would have to leave this place and go to Bolga [or Kumasi] to be a porter or wash bowls for food sellers. As for the boys, they have a lot to choose from. They can learn carpentry, fitting, masonry, tailoring or become drivers' mates.

A noteworthy finding from interviews among ASM participants is that farming is not mentioned as a potential alternative economic opportunity by either males or females. Upon further probes, it emerges that participants categorize their engagement in farming as normal activity which is part of their life and not necessarily a viable alternative. The probes also reveal that before

their engagement in ASM, participants are previously engaged in farming. Thus, it is not difficult to see why they do not list farming as a potential alternative since they have previously engaged in it without successfully improving their economic circumstances.

4.2.2 Apprenticeship accessibility challenges

The next recurrent sub-theme explaining why young people engage in ASM instead of other economic activities centers on challenges associated with obtaining the necessary skills. Many of the desired alternative opportunities listed by study participants require extensive periods of apprenticeship to learn the required skills. According to respondents, there are many challenges to such ambitions. One of the challenges identified by respondents is proximity to apprenticeship centers. Apprenticeship centers tend to be located in major towns which are far from mining communities. This is illustrated by a male participant who had an interest in being a mechanic:

> I did not just wake up one day and decided to come here and do galamsey. No! Before coming to join the mining business, I first wanted to be a mechanic but there was no one here to teach me. I must go to Bolga to learn that job but that is too far. I could not commute every day so I joined my friends here.

Respondents also indicate that in some cases the best apprenticeship training centers are located outside of the Upper East Region which makes it even more difficult for them to acquire the necessary skill. Another respondent who also had dreams of becoming a mechanic explained why he thinks Kumasi in the Ashanti Region is the best place to learn his trade:

> Kumasi is the place to go and learn to become a mechanic. You learn better when you train at a place where different cars with different problems are always coming to the shop. Kumasi is too far and I don't have any support to go there and learn so I decided to join my brothers in the galamsey business.

The above sentiments are usually associated with trades that tend to be concentrated in large urban areas. However, some participants indicate that other trades such as carpentry and dress-making have training centers in smaller towns. Respondents note that the need to move to urban centers is because of the absence of skilled personnel living in their communities who can offer such training services. This point is illustrated by the following quoted from a participant in a FGD:

> When you can't find people within your area to teach you the skills for doing the job you want to learn, you must go somewhere else to learn. When I wanted to learn carpentry, there was no one in this community to teach me so I had to leave my family here and stay at Tongo for a while just to learn. Initially, I thought I could go and come home every day but it was very difficult so I finally decided to stay there. I was very determined and I continued because there was no carpenter then in this community so I thought I would make money after my apprenticeship.

The absence of training opportunities in the communities of residence of the study participants is due to the smaller sizes of such locations which makes it unprofitable for certain businesses to be located there.

From the interviews, another issue which emerges as a major challenge to people interested in apprenticeship is cost. Participants frequently narrated their inability to complete their training due to lack of financial support. The cost component is in two folds. First, some respondents indicate that transportation cost of commuting to learning centers and other costs such as food are challenging, and prevent them from acquiring desired employable skills. According to participants this situation influence many to abandon apprenticeship and take up work in mining sites. This is illustrated by the following quotes from a male participant who shared his experiences:

> After I realised the mechanic training centre which was so far away was not going to work, I tried masonry for 1 year but there was nobody to help me. I was motivated to switch to masonry because the trainer gave GHC0.50 a

> day but that couldn't help me in any way. How could I live on GHC0.50 a day?

The above illustration where the young man who shared his experience indicates he had attempted apprenticeship training in two difference occupations is not unique. It is interesting to note also that not all instructors give their trainees money for contributing to productivity while still in training. This is illustrated by the experiences of a female participant as follows:

> I started learning hairdressing before joining the miners here. It was difficult to even find something to eat before going to work each day; and you know as an apprentice you get nothing from your madam. So, I had to stop the apprenticeship and do galamsey for a while so I can make some money and go back to complete my apprenticeship.

In the case of those who received some stipend or compensation from their instructors, many indicated that this was meagre and unable to meet their daily needs. This prompts many to quit and join ASM.

The cost associated with skill training prevents many participants from pursuing apprenticeship avenues and rather seek employment in ASM. According to participants, financial charges demanded by instructors before providing training are out of their reach. For many participants, this discourages them from pursuing apprenticeships. This is illustrated by a male participant who seem to have given up on his dream of becoming a mechanic:

> I always wanted to work as a mechanic because I love cars and motorbikes. When I went to ask how much it will cost for me to train, that was when I realized I must do something else with my life because I couldn't afford all that money they were asking me to pay.

For some participants however, ASM is a means to obtaining money to pay for apprenticeship and obtain their dream employment. This group of participants indicate that they are hopeful of ending their participation in ASM in the near future. Some of these sentiments are expressed by a female participant who has been working in mining sites for almost a year:

> When I wanted to learn hair dressing the women asked me to pay some money and because I don't have it, I have to do galamsey so I can save some money to pay for the apprenticeship. People charge differently but the hairdresser in my area said she will teach me and she requested I pay her GHC50 before I start.

Others narrate experiences where they are provided with quotes which they consider as exorbitant and even exploitative. For example, another female miner who indicates she was unsure if she will be able to pursue her apprenticeship dreams shared her experience:

> I spoke to a woman in my community about my willingness to learn dressmaking but she said I had to pay GHC700 before she could teach me. That amount would cover the cost of a sewing machine, a pair of scissors, a chair and the lessons. I don't know if I will be able to get all that money.

Due to the cost constraints associated with the desire to obtain apprenticeship, many participants resort to ASM. While some participants indicate that this livelihood trajectory change is a permanent diversion from their dreams, others were still hopeful of eventually obtaining skilled training to explore employment opportunities outside of ASM.

4.2.3 Lower entry requirements in ASM

The relatively lower entry requirements to participate in ASM is the final major sub-theme which help explain the rapid growth in the number of people engaged in the activity within study communities relative to engagement in alternative economic activities. Respondents indicate they do not have the adequate formal education and specialized skills to pursue careers in other sectors. As such, respondents were of the view that ASM is the best option immediately available to them. This is illustrated in the following quote which exemplifies views which suggests ASM is the economic savior of those without formal education:

> I never attended school. I never stepped into a classroom; and because of that, there is no work for me to do here or any part of Ghana. I was a cow boy as a young boy. I woke up every day and took the cows out to graze

> and came home. And the thing is, here there is no other work except galamsey. For an uneducated person like me galamsey is the best for me. This is the right work for me; it has really saved me.

The educational levels of youth respondents in the sample are very low. Among the forty-five youth miners interviewed, only one of them has completed a tertiary education (diploma) with specialization in Agriculture. Eight of them dropped out of school at the Junior High School (JHS) level and five of them were Senior High School (SHS) graduates. It is shocking to find six of the miners have no education and four people in this category are females. Also, thirteen of respondents dropped out of school at the primary education level. Nearly all respondents who completed some level of formal education did so at a later age due to interruptions during their school years. These interruptions are primarily from hardships faced at home. A respondent who dropped out of school at primary six when he lost his father also draws the connection between his educational level and employment options:

> So the reason why I am doing this work is because I don't have any qualification to work in an office. In fact, there is no other work for uneducated people to earn enough money as this; so, I engage in galamsey. There are many of my friends here who like me also dropped out of school to do galamsey.

Educational backgrounds are not taken into account during hiring at ASM sites. Hence, uneducated or semi-literate youth capitalize on that opportunity to be engaged in the industry. In describing how dire his circumstance could have been if educational levels are taken into consideration for ASM employment, a participant retorts as follows: "If I needed school to do this, then imagine what would have happened to me".

The above views coincide with opinions expressed by a government officer, the District Chief Executive (DCE), who indicates that even educated youth within his administrative district have challenges finding employment. He emphasizes that the situation is even more difficult for

those without formal education and indicates he is not surprised that ASM has become an important source of employment for many people. The DCE makes the following observations about employment in the district and beyond:

> These days unemployment is an issue everywhere in this country. It is a very big issue even for graduates. You and I also know that these days people with higher levels of qualifications compete with SHS certificate holders. So, some of the low performing high school leavers know the difficulty to compete in the formal sector… so they quickly move into mining.

Both key informants and respondents who participate in ASM acknowledge that the most important asset for gaining employment in this industry is physical strength. It is therefore not surprising that an overwhelming majority of study participants who work in mining sites were below the age of 30.

Related to the above, respondents indicate that their participation in ASM do not require them to invest in expensive mining equipment. This is a big incentive for those who intend to participate in ASM for a short period as illustrated in the following two quotes expressed by different respondents:

> I did not have to buy anything when I started this job. I just wanted some quick cash to help me pay for my education. I went to the mining site and I told them I can dig and carry rocks and soil in head pans. I didn't have to buy anything. With galamsey, you don't need to own anything once you have the strength to work.

> The day I wanted to start this job I just walked to the mining site and spoke with the site manager. He called the concession owner on the phone and told him I wanted work. I started work that morning without owning any equipment.

In addition to ease of obtaining employment without the need to invest in equipment, participants also repeatedly add that it is an easy way to making money. This is illustrated in the following quote:

> We don't need to own machines for galamsey if you work for someone…If I had to own equipment, I might have to borrow money to by them. Because of that I make money in this business even more than those working in restaurants in Bolga. By the grace of God, I am gradually making money.

Thus, for many respondents the low entry requirements associated with ASM participation as well as the potential to make a decent money, relative to other economic activities, constitute an important incentive for their engagement in the activity.

4.3. Geographical Proximity

There is a consensus among the views expressed by study participants in IDIs, FGDs and key informant interviews that the high number of community dwellers engaged in ASM is due to the location of gold within their immediate environs. It is particularly interesting to note that regardless of whether study participants were directly engaged in ASM or not, the opinions about the presence of gold resources in the area are generally positive. For example, a key informant who has never worked in ASM indicates the following:

> Just imagine if there was no gold in this area. What work will the young people do? Even farmers work in galamsey during the long dry season. The people are only taking advantage of the things God has given them and they are fortunate to have gold right in their hometown. So many don't have to travel to other parts of Ghana to look for jobs. We are really lucky to have such resources here.

In his discussion of the presence of gold resources in the community and increasing participation in ASM, the DCE expresses some concerns. He indicates that there have been attempts to increase the interests of communities in farming but these programs have not produced meaningful results.

> In the Eastern part of our district where most of the mining is taking place, farming has reduced in the last few years. They work in the mining sites because they have the gold close to them and they prefer to mine instead of farm. If they did not have the gold, they would take up other opportunities.

Drawing on comparison between two communities in the district he indicates how their intervention programs receive varying results due to the presence of gold-rich soils. He elaborates as follows:

> We [the government] have worked on dams in the eastern area and we expect the youth to farm during the dry season but they don't do it. In the western part of the district where there is no gold, communities have few options so they farm. They farm along the White Volta using pumping machines to pump the water to their various farms and other resources we have provided to aid their farming activities. In the eastern part of the district, all those facilities are rotting away because everyone want to get rich quickly through galamsey.

Besides the disinterest in agricultural support programs, it also emerges that youth in gold-rich communities are not interested in other government youth employment related programs. The government official in the district office responsible for Youth Employment Programs (YEP) makes the following comments about youth in the Eastern part:

> We regularly organize programs at the district office for the youth and we invited everyone we can reach. Just recently, we had a basket weaving program which was opened to especially the youth in the mining areas but most of them did not complete the training. We realised that their eyes were fixed more on the galamsey because it right there in the community.

The above concerns raised by government officers are however interpreted differently by other key informants and study participants engaged in ASM. Generally, those with this counter view describe the presence of gold in their communities using phrases such as "blessings from God", "new opportunity to be rich" and "new light out of poverty' among others. In this regard a, key informant who is a community leader expressed the following:

> Previously, all we could do was the farming but now we have gold and that gives our young men work to do. Very soon, people will hear about the gold here and the big companies will also be coming here to mine like it happens in the South. This business will be huge in few years so it is good we are participating in it now. This small village you're seeing today will also

> become big like the mining towns in the south [of Ghana]. That is why all the young people are now mining.

The above view seems to suggest that the discovery of gold and subsequent participation of young people in the sector will be a panacea to the development of the area. In similar light, younger participants also express their excitement about the discovery of gold and the growth in the number of people engaged in ASM. A young man asks the following rhetorical questions:

> Ah! We are happy there is gold here in our hometown. But what do they want us to do? We have gold in our community and you don't want us to work? Isn't it good that we are rather working with what we have?

Other participants also question government's true intentions. A participant aptly expresses this sentiment by asking: "…or do they want other people to come here and do the work whilst we sit here idle"? Overall, the support for ASM activities in study communities is strong among community members and leaders alike. From the interviews, it is clear the existing support for ASM is manifested at two levels — family and community level support which facilitate growing participation.

4.3.1 Family Support for involvement in ASM

All respondents except two, indicate that their families have no problem with their choice of work. It is therefore not surprising that about half of the respondents (20 out of 45) were introduced to ASM by a parent or family member. In some instances, initial encounter with ASM operations occurred because participants followed a parent or family member to mining sites. A 19-year-old participant recounts how he was introduced to the business;

> I was about eight years when I followed my mother to the mining area. She was doing that work so she asked that I came along. I helped her wash the ore. That is how I also started doing this work. Even though my mother is no longer working here, she showed me I could earn money here in my village without going anywhere.

It is noteworthy that many participants who are introduced to ASM by family members participate in this economic activity before adulthood. Younger people usually work with their parents in the same mining pit for some time before joining their peers after gaining sufficient experience. A participant in a group discussion stated:

> We all do the work together…we work with them [parents]. When we work together, we are just assisting them so they choose when to give us money. Sometimes they give us some money to keep for ourselves but mostly they claim the money made from our work is what they use to cater for the household.

Although this practice is common, some respondents indicate that such incidence is used as motivation to work independently. Respondents indicate that parents are happy to give their blessings for them to engage in ASM when they inform them about their decision to be miners as exemplified in this quote:

> I told my parents I wanted to come to this mining site and they did not prevent me. I was doing nothing at home and they knew there was no work for me. I had an uncle and a brother already here doing the mining work so my parents did not mind. They support me because the work is right here at home.

According to participants, the willingness of parents to grant permission for their children's participation in ASM is usually because they know people who have achieved some financial success because of the industry. A male participant shares this view;

> I had already heard of the galamsey work ongoing in this place because my senior brother came here and made some money. I thought this would be good and so far, I haven't been wrong. My father did not hesitate to encourage my intention to come here and now it is better here for me.

Some of the encouragement and support for ASM participation from parents is spiritual in nature. Many participants indicate that the prayers offered by their parents are important for their success. These prayers are often routine as indicated in the following comment:

> My parents are happy for us. Whenever we leave the house for work, they pray for me and my brother so we can have more money at the workplace. This shows that they want us to succeed.

The support from parents reassure the youth miners that under current circumstances ASM presents a better means of livelihood within their communities relative to other alternatives.

4.3.2. Community involvement and support for ASM

At the communal level, particularly among community leaders, the study finds that there is a high acceptance of youth participation in ASM and contributes to the growth of the sector. Similar to the views from family members of ASM participants, community leaders interviewed as key informants indicate that it is imperative for energetic young people to participate in ASM because it is located in their locality. Thus, although striking, it is not surprising to see a basin-like trough made from clay for washing gold ore at a chief's compound. Although there was no work ongoing in the compound during the visit, it was obvious that members of the chief's household were involved in ASM as well. This observation demonstrates the extent to which community leaders encourage residence to take advantage of the presence of gold in their environment by engaging in ASM. The chief confirms his support for the engagement of youth in ASM in a key informant interview. According to him, his support for participation in ASM is connected to the economic benefits the sector provides for his people, other adjourning communities in the Upper East Region and the country at large. He stresses that there is no need to prevent people from engaging in ASM. According to him, ASM provides more employment in his community than all government programs currently rolled out. He reiterates his support for ASM as follows:

> I and my elders don't stop people from working; especially the youth…where do you want them to go to? What the government cannot give them, they find here at home and since we are living in peace there is no reason to stop anyone. I am happy that there is gold in our lands. My people now have work here and don't need to travel to find work.

The opinions expressed by the chief are similar to those of the Tindaana, who is a spiritual leader and the custodian of the land. He heartily talks about ASM in the community and describes the activity in a positive light using phrases such as a 'life saver'. He expresses the community's unyielding support for participation in the ASM especially for young people by making the following remarks:

> All we had known was farming until we realised we had gold on our land. You see, gold does not just appear in your land. There is always a reason why that happens. When I was young, we only heard of gold in Obuasi, but the ancestors have seen the sufferings of the people; especially the young ones. They don't have anything to look up to but this galamsey work for now so we support them.

The lack of alternative employment opportunities is a reason for the strong community support ASM enjoys, especially because the resource is located within their boundaries. The opinions expressed by the two most powerful community leaders (i.e. the Chief and Tindaana) in support of ASM within their territory, along with the call for younger people in particular to take advantage of the situation contributes to growth numbers in the sector.

4.4. Conclusion

This chapter presents the underlying motivations for youth participation in ASM. Three principal motivations for ASM are identified — poverty dynamics at three levels, the absence of alternative economic opportunities and proximity of gold-rich resources. The chapter shows that poverty dynamics at the individual, household and community levels are intricately connected and influence people to engage in ASM. Daily challenges such as food insecurity and inability to pay school fees within the context of endemic poverty in their communities influence participants to engage in ASM from a young age. In study communities ASM is perceived as an important route to alleviating poverty and improving lives. Alternative economic activities are generally absent and under current circumstances the limited alternatives do not present communities with

prospects for escaping poverty and are therefore generally less desired compared to ASM. The challenges associated with pursuing such alternative livelihood opportunities including costs vis-à-vis the lure of instant riches and low entry requirements make ASM more appealing to people seeking opportunities. Finally, I demonstrate that the proximity of gold-rich lands in the environment of participants fueled by familial and community level support helps normalize participation in ASM. These support systems provide further justification to community members and helps explain the increasing youth participation in ASM.

CHAPTER FIVE

PERCEPTIONS OF OCCUPATIONAL HEALTH RISKS ASSOCIATED WITH ASM

5.0 Introduction

An important theme which emerges from conversations with ASM participants in this study relates to health risks associated with this method of prospecting for gold. Even though ASM is a critical source of livelihood for participants (see Chapter 4), the activity is also associated with certain practices which have consequences for occupational health and safety of miners. This chapter presents an analysis of the perceptions of occupational health risks associated with ASM among study participants. I set out to demonstrate the extent to which perceptions of mining related risks help miners make decisions about health and safety while considering the socio-economic motives for their participation in ASM. In the ensuing sections, I first provide a detailed description of the working environment of ASM in the study communities. The overall working conditions and the number of hours involved expose participants to many health risks including loss of lives and various forms of injuries. This is followed by a discussion on difficulties in access to health by youth miners and the chapter concludes with practices adopted by miners in the effort to create safe working environments.

5.1 The work environment and ASM methods of operation

To understand the health risks associated with ASM, it is relevant to examine the general work environment in which miners operate. Thus, in the next sub-sections, a detailed description of the working conditions in mining camps is provided. I focus on the methods of operation employed in the study communities and highlight gender dynamics in the work environment. Attention is also given to the work duration associated with mining practices.

5.1.1 Surface mining operations and practices

The practice of small-scale mining in the study communities can be grouped into two — surface and underground mining. Although the two methods differ based on the level of mechanization and depth at which mining operations are undertaken (Bansah et al., 2016), it is common to find youth miners participating in both concurrently. Youth miners narrated that the decision to engage in either underground or surface mining depends on a variety of factors, principal among which is individual perception about which of the two is economically more lucrative. Other factors include prevailing circumstances related to mining such as disruption of mining activities by government anti-ASM operations and conflicts among ASM team members. Regardless of the preferred method, overall, ASM is a highly labor-intensive activity. Although the procedures have been slightly mechanized in recent times (through the introduction and use of equipment such as drilling machines, crushers/millers, compressors, etc.), ASM still requires the application of extensive manual efforts (Chamber of Mines, 2008). Typically, artisanal and small-scale miners use tools such as shovels, hoes and pick axes in the gold extraction processes.

Due to extensive alluvial gold deposits in the research area the most popular method employed in gold extraction is the surface mining method. It is also commonly referred to in the literature as the dig and wash method (Bansah et al., 2016). This method is practiced along river banks and involves the digging of shallow pits of less than 10 meters deep without the use of machines to remove the top soil and expose the gold-bearing rocks. This method does not involve excavation of the hard sub-surface ore. Due to the very rich nature of the soils and rocks in the study area, in certain cases, gold nuggets could be obtained in pits which are less than two meters deep. In some of the research communities, it is common for children to go on successful ‘gold hunt’ after very heavy rains as loose soil materials are washed away by surface run-offs which

expose the minerals. Older people who are engaged in ASM sometimes also take advantage of heavy rainfalls to prospect for other mineral fertile locations which are then eventually mined for gold, using the dig and wash method.

Gold extracted through the dig and wash method do not go through the crushing, grinding, amalgamation and burning processes. Retrieved rocks or soils are thoroughly washed which allow the nuggets to settle as sediments in a bowl.

Figure 5.1: The Dig and wash method (Left) and gold nugget retrieved from wash (right)

The picture in Figure 5.1 on the left shows a pit dug for gold rocks through the use of rudimentary tools such as hoes and pick axes (the commonest tools used in surface/dig and wash method). The picture on the right in Figure 5.1 shows gold nugget retrieved after thorough washing of the rocks in the bowl without amalgamation or burning. A nugget of the size in Figure 5.1 above could earn a miner a few tens of Ghana cedis. At the time of this research gold nuggets measuring about 0.8grams or half a teaspoon were valued between GHC80-100. Gold of this size or measurement was popularly referred to as a *blade of gold* by ASM operators.

Not only are there differences in roles played by male and female miners as reported by Yakovleva (2007), interesting gender differences exists between surface and underground mining as well. In surface mining, female youth miners, work together with the male miners as diggers, load carriers and washers. In some instances, teams are made up of people of the same gender – males only or females only. Most of male miners indicate their unwillingness to work with females. Male miners state that difference in strength based on gender is a compelling reason to avoid working together. An 18year-old participant who leads a group of male miners remarks:

> As for me I don't work with the girls because they cannot work the way we [boys] work. When you work with them, they want to share what you get equally meanwhile they don't have the strength to dig and we do the hardest part of the job. They could make money for the day when we work with them but they should not expect that we share everything equally with them. If I work with a girl for instance and we make GHC100 a day, I can give her GHC30-40.

Young female miners, are aware their male counterparts describe their work with uncharitable words such as "lazy" and "weak". Thus, female respondents indicate their preferences for working with other females or their parents. Their unwillingness to work with male miners is most strongly expressed in an all female FGD. A participant expresses the following sentiments using a very strong tone:

> No!! we don't like working with them [males]. It is true when we work with them they do the digging and we fetch water and do the washing but they cheat us when we work with them….they give you a small amount of money after you have finished work. They think our work is not hard. Sometimes when you even find the nugget, they will collect it from you and hide it.

Females feel they are exploited any time they work with male miners. These narrations support the literature on the gendered nature of ASM in terms of roles and remunerations received (see AU/AMDC 2015; Dinye & Erdiaw-Kwasie, 2012).

5.1.2 Underground mining operations

The underground method is utilized in locations where gold ores are deposited deep beneath the earth. ASM operators also commonly refer to this method as the *ghetto method* to characterize the narrow and congested nature of underground tunnels used in their operations (Bansah et al. 2016). This method involves the application of some sophisticated equipment such as drilling machines, shafts and milling machines. The method also involves blasting of hard rocks with the aid of explosives such as dynamite (referred to as *food* among miners). Overall, the mining process involves excavation, crushing and grinding, sifting or sieving (locally termed *shanking*), washing/sluicing, amalgamation and burning. Each stage of the process involves miners with varied skill sets (mainly from experience) undertaking different roles. Categories of specialized underground workers include drillers, chisellers, blast men, and locum boys (van de Camp, 2016).

As confirmed by van de Camp (2016), underground mining typically takes a few days to reach a stage where rocks are gathered for the actual gold extraction process to begin. The underground method is usually initiated by drillers who use drilling machines to cut holes into the ore containing rocks at depths beyond 10 meters underground. Afterwards, *blast men* survey the rocks in the various underground tunnels and carefully prepare the place and the dynamite to be used in blowing up rocks. After the explosions, miners usually allow several hours before returning underground to ensure they are not exposed to the fumes from the explosives. Chiselers then go underground to carve and smoothen the rocks using chisels and hammers. They also help to break the rocks into smaller pieces. The final step underground involves locum boys crawling into the tunnels to further crush rocks, pack them into sacks and pass the rocks through a chain of hands.

Remuneration for youth miners labor is often in the form of sacks of gold-laden rocks weighing between 20-30kg. The miners narrated that the number of ore sacks received is however

not static but depends on the quantity conveyed from the underground mines. After the collection of rocks, miners split into smaller groups to begin the actual gold extraction process. At this stage the rocks are ground into smooth powder. The grinding is done with mechanical grinders/crushers or manually with metal mortars and pestles depending on the quantity of the rocks received. Usually the ore is ground multiple times into fine powder form as depicted in Figure 5.2; and the final stage of the extraction process is amalgamation and burning to recover the gold before it is sold to local traders (Bansah et al., 2016).

Figure 5.2: the grinding process using pestle and mortar (left) ground rocks (right).

Where mechanical grinders are used for crushing, female miners report that they are contracted by the male miners to carry the rocks to the crushing and grinding machines. Apart from this process, female miners generally do not participate in underground mining processes. Unlike in surface mining, respondents indicate that women are not permitted to participate in the excavation process due to the depths of pits in underground mining. Women are considered bathophobic and male respondents usually use words like “faint-hearted” to justify this decision to exclude them from the digging process. Female respondents lament that their male counterparts

sometimes deliberately exclude them from the rest of the process after the rocks have been delivered to the grinding sites. According to the female respondents, males usually exclude them by manually grinding the rocks. The following quote explains further:

> After we carry the sacks of rock to the grinding sites, sometimes they tell us our work is over because they will not grind the rocks with machines. Even though they tell us they want to reduce cost we know it's because they don't want us to be involved. They tell us we are not strong enough to grind manually and use that as an excuse to give us small quantities of grinded rock.

Female miners who are familiar with the discriminatory practices of male miners (i.e. manually crushing the rocks) complain that males do so only to keep them [females] out of work. After rocks are ground into fine powder, female miners may then be involved in the process again to sieve for gold. According to female miners, this decision by male miners is a deliberate strategy to exclude them from the mining process and some respondents conclude that the persistence of this practice has put some women out of work.

5.1.3 ASM work duration

Typically, there are no fixed hours for work among surface and underground miners. Especially with the underground mining, operations can take place 24 hours a day, 7 days a week through a shift system. Work is mostly interrupted only by the need for breaks and the unavailability of some resources such as machines, fuel and the breakdown of digging equipment. Breaks during work are intermittent and not formalized (Bansah et al., 2016). For surface miners, work begins in the mornings around 8:30am till about late afternoon – 5pm. In the communities where surface mining is practiced, a majority of the youth attend school. Thus, they usually participate in ASM right after school — typically from 3pm. Students however, work longer hours during weekends, national holidays and when school is on break. However, for the children of

school-going age (i.e. between 9 and 18), who are not enrolled in school, ASM work is done all day with their parents or their peers. Sometimes the sun becomes the only deterrent to their work because work is extra tedious due to the scorching sun as explained by an 18- year- old surface miner:

> I work very long hours. We can work all day and every time; unless maybe it rains and the sun is too hot. It can be very hot sometimes so when that happens you want to take some breaks. You have to drink a lot of water because you get tired too often.

Among underground workers, drillers in particular express concerns about the lengthy times spent working in uncomfortable conditions. Majority of them indicate a preference for night shifts because night temperatures are favourable for work. This also helps them avoid heatstroke which some respondents indicate as a health risk. The representative quotes below demonstrate the major concerns of drillers:

> We spend the whole day underground; you know when you are there you have no idea what is happening up here and you don't even check the time. By the time you come out you realize all the stores have closed and no one is outside. Sometimes we spend even two days underground…the work is not easy. We do everything there…eat, drink, everything.

> As for me, my time is not fixed. I go inside anytime I have to. I can go to work and go into the pit at 8 o'clock in the night then I come out 4:30am. I do afternoon shifts too but I prefer the night. In the night when you work you know there is no heat, the weather gets cool and it is not crowded so you feel comfortable. There is too much noise in the afternoons.

The long hours of work can be burdensome for youth miners by causing some health effects; some of which are subsequently mentioned by respondents when asked about ailments suffered because of their work. Detailed accounts are reported in section 5.2 below.

5.2 Experiences and perceptions of health risks among miners

Miners were asked about their personal health experiences and knowledge of possible ASM related health effects. Thus, this section focuses on the experiences, perceptions and knowledge of health effects from participation in ASM. All participants who are engaged in ASM indicate they are aware their work has some health consequences. For example, a participant talks about the health impacts of ASM operational procedures vis-à-vis his motivation for this work:

> I am doing this work because I want to get rich. I can also tell you that there are many dangers to the body in doing this work because we use chemicals and sometimes we go underground. Some people have died in other places, we fall sick and get injuries but I can't say I will stop because of that. I want to make a lot of money so I will have to work here. If not what else will I do?

The above quote demonstrates that the hopes of getting rich is an important motivation for many miners even when they recognize the health risks associated with the activity. Importantly also, the rhetorical question posed by the participant indicates the lack of employment opportunities in the mining communities. The quote also aptly presents a summary of the range of health risks associated with ASM which are presented in detail below. In this section, responses are categorized into minor and major/severe occupational health risks and summarised in Table 5.1 below, based on responses obtained from miners.

Table 5.1: Common health complications associated with ASM as named by miners

Minor risks	Number of counts	Major risks	Number of Counts
Headache	9	Death (mainly from inhalation of explosives and mercury)	13
Chest pains	14	Entrapment	12
Injuries/cuts from rocks	18	Liver problem	1
Other bodily pains	16	Deep cuts and injuries from the use of equipment and motor accidents	9
Fatigue	4	Chronic and severe cough	9
Heat burns	1	Exposure to dust and fumes	5
		Lung infection	1

Source: Field data

5.2.1 Minor occupational health risks

The health risks in this category are generally associated with specific processes of ASM operations which require the use of intense manpower or brute force. The minor risks noted in Table 5.1 are associated with activities such as digging, drilling, heavy load carrying, breaking of rocks into smaller pieces and packing of rocks into sacks. During a female-only focus group discussion, respondents recall the efforts needed for digging for gold and how that affects their health:

> The work is very difficult especially because of the digging. These days you will have to dig and dig further and that causes tiredness. Even when you don't dig much, fetching the water and the energy required to wash makes it very difficult. Each day after work, we have bodily pains, waist, hand, and neck pains. Every bone in our bodies aches by the time we leave the site in the evening.

In another focus group, an underground miner reports the inevitability of injuries in ASM. He wonders how one could think of completely avoiding injuries and still be involved in ASM. He goes on to recount a gruesome experience he had:

> As for injuries we all sustain some injuries a lot of the times! Everyday there is someone injured but usually these are small. As for that one you can't escape it. I was injured about 4 weeks ago whilst working with my boss in the pit and a loose rock dropped and hit me. I had several wounds on my head and shoulder. As for those wounds and injuries you can't do much about them. It is part of the work.

These accounts illustrate the frequency of health risks experienced by miners. Interestingly, respondents categorize these as minor risks to which they have become accustomed. Respondents associate minor injuries sustained in the course of work as part of the process of gaining experience in the work environment. Work related health problems such as headaches and bodily pains are common among miners. Although most participants label these aches and injuries as minor health risks associated with ASM, they are not considered occupational hazards. This is illustrated in the following quote from a focus group:

> As for the headache, it is normal. Everybody gets headache…even those who work at the stores also get tired too and complain of headaches and bodily pains. How much more doing this work? Sometimes you can wake up tired from bed or come back from school tired so it is not just a problem for those of us who do galamsey.

The trivializing of these health problems could have cumulative consequences and negatively impact long term health of miners. Irrespective of this, miners do not associate potential longer term health consequences with conditions they consider as minor.

5.2.2 Major occupational health risks

Various research and the media alike report horrific incidences in mining camps especially within the ASM sector (see Kyerematen-Amoah & Eshun, 2015; GhanaWeb 2016,

ModernGhana, 2014). From Table 5.1, it is evident that work-related fatalities occur in mining camps. Miners consider the toxicity of mercury (locally termed *med*), explosives and other chemicals as the major causes of death. During field visits, it was apparent that miners handle mercury without following any specified safety procedures. Miners are therefore asked about their knowledge of mercury and the risks associated with it. Responses provided by miners suggest a general awareness of the toxicity of mercury, however, this knowledge to some extent can be considered limited because among a majority of miners, mercury is only deadly when ingested through the mouth or inhaled. Many interpret mercury to be restricted to swallowing the liquid only. The following quotes from two participants in a FGD summarize the general mindset among the miners:

> Oh if you use your hand to touch it you won't die…. nothing will happen to you. However, if you mistakenly eat it, all your intestines will be damaged and you will die immediately. Trust me, you won't even live for a day and you will be gone [dead]. So it is very dangerous that is why we make sure it does not enter the mouth.

> I wanted to say that during the burning too you have to use something to cover your nose because it is very dangerous to allow it [inhale] into your body. It can cause you so much harm; that is why it is good to always use something to cover your nose.

Overall, mercury poisoning is a major concern at mining sites. Consequently, concession owners, miners with many years of experience usually offer advice to younger and less experienced miners on the dangers of the chemical and how to handle it. An interview with an underground mine owner who doubles as the Deputy Organizing Secretary of Ghana Association of Small-scale Miners in the region confirms the attention given to mercury use at the sites. The key informant explains that stern warnings and education on mercury use is given to youth miners before they commence work and had the following to say:

> As soon as they join us we teach them how to use the mercury. Some years ago we did not know much about it until a study was conducted just as you are doing. They even brought laboratory kits and sampled peoples' hair and urine for test so it was the results that made them warn us to be careful with the mercury. Since then we have taken it upon ourselves to teach everyone who works here. That is why majority have the knowledge on the use of mercury. We tell them never to get it close to their mouth and also when they are burning, the vapor that comes out is harmful so they shouldn't inhale it.

Regardless of this advice, most youth miners use bare hands during the amalgamation process without any consideration of the possible effect this could have on the hand or skin. In the interviews and FGDs, only one miner reflects on a possible harm of mercury on hands. The respondent expresses his concerns as follows:

> *Med* is very harmful not only when you eat it. I think when you use it on your hand it can affect you. Sometimes you can see how your palms look different after using it for a long time. But I don't know what will happen when it touches your skin.

Due to the limited knowledge on the repercussions of mercury coupled with anticipated harm this heavy metal can cause, some underground miners accept their lack of expertise and avoid the gold burning process. They permit gold buyers who are considered more skillful to do the burning. Also, as an occupational norm, females are not permitted to burn or get close to the burning process. It is believed that the presence of women during the burning can cause the evaporation of the amalgam to the extent that no gold will be recovered after the process. This arrangement is more of a superstitious custom which is accepted in mining communities visited in this research.

Participants also highlight other health hazards related to exposure of dust and other harmful fumes during mining activities. In this regard, respondents associate their work environments with health conditions such as lung infection, severe cough and chest pains as

sicknesses that bring enormous discomfort. According to a 23-year-old female miner, her protracted cough, her husband's chronic chest pain and her colleague's health issue are consequential effects of the work on miners health. She narrates her experiences:

> As for this work, it is not easy. The dust alone can kill us; you realise I have been coughing since we started talking. I have had this problem for some time now. These days when I cough my chest hurts badly but I have to continue to work because I am taking care of my children and husband since he can't work any longer. We have so many people falling sick and some are in the hospital as I speak. This woman sitting right here (pointing to a woman 10m away) has been asked by the doctors after an x-ray scan not to do this work again because of the dust but she came back to it because she has to eat. My husband, worked as a locum boy and now has chronic chest pains; we have been to Walewale, Bongo and Tindongo health centers and many more. Just yesterday I got some drugs from Obuasi for him to ease the pains. He can't even turn his neck.

Respondents indicate explosives release poisonous fumes and can contribute to the respiratory problems. However, none of the respondents in this study had ever sustained injuries from explosive blasts. Dust induced respiratory problems are the commonest among drillers. Narrating the nature of a driller's work, this miner enumerated the challenges drillers in particular face;

> As for the work we are doing here, you hardly hear that a chiseler or locum boy is dead. Drillers are always dying from lung infections. Even as we sit here, should someone toss this sand into the air twice you will realize the amount of it we can inhale. So when you go to work as a driller underground and stand in the dust for 2 days just imagine that. Yes, we can stay there for 2 consecutive days and work and talk at the same time, so you inhale so much dust. But it is not just the dust; the drilling machine also uses some oil. So the more you work, the oil and the dust mixes together. The more you inhale that mixture, the sicker you become.

Entrapments and collapse of underground pits are identified by participants as the most dangerous risks that cause numerous fatalities in mining sites. Entrapment is usually the result of weak,

unsupported or poorly supported stopes (Bansah et al., 2016). For instance, the media reports a horrific entrapment incident which occurred at a mining site in one of the study communities involving several miners in 2013. During interviews, participants refer to this incident to justify the point that entrapment is the riskiest part of ASM among underground operators. About 15 out of the 22 respondents in this community cite the incidence although many are unable to give in-depth account of the event. A participant who was at work on the day of the infamous accident recounts his narrow escape. With intense emotions, he recalls his narrow escape by giving the detailed narration below:

> The accident occurred at what we call the Obuasi[4] site. So much gold was discovered so people rushed there. I was contacted by one of our bosses to gather some boys to begin work so we started and all of us were happy. We worked hard and on the third day underground, we were ready to collect the ore and share. On that third day, I slept in the pit to watch over the rocks and I had a dream in the process. In the dream, I had a black stone full of gold. But when I picked it and decided to climb out of the pit, the stone fell and the pit started collapsing in the dream. If an older person had this dream he could have taken a step to revert it. But I wasn't wise enough; I couldn't understand it and took it lightly, only to realize God actually revealed what was to happen to me.
>
> Early the next morning one of the guys was surprised at my courage because he said he saw cracks in the ground yet I laid there alone. He asked that I go up and have some rest. So I climbed up to the top ...right at the tip of the pit to sleep more. Around 5am my boss and the other boys came to work and we started collecting the ore. There were about 5 of us, including our boss. The boy who was lying here [besides us] was part of the team but he got out of the pit because he needed to go home for a short break. We dug the rocks until at a point all we could see was gold…a part of the stone was black and another part was all gold [just like what I saw in my dream]. We had gone with only 10 sacks and needed more, so our boss asked me to leave and go

[4] This site was nicknamed Obuasi because of the rich nature of gold-bearing rocks in the area similar to Ghana's most popular gold mining town which bears the same name

> to his house to ask his wife for more sacks. I obliged and left the ghetto immediately.
>
> I met one of my brothers whose motorbike I collected to go get the sacks and he went down into the pit. I was shocked that as soon as I left, the pit collapsed on them. Oh!! my boss and my 2 brothers … the cave collapsed and covered all of them up. We could hear them groan but none was rescued. Only the 2 of us survived…myself and the guy who took the break. We heard one of them crying for help; we tried so hard to bring him out but no, we couldn't. He cried until we heard him say he only needed to drink water before he died. When we couldn't hear him any longer we knew he was dead.

The in-depth account given above reflects the degree of risk taken by ASM operators especially when a mineral-endowed land is discovered. The rush for gold by miners results in unmonitored digging creating conditions for the possible collapse of underground mining tunnels. Although the account provided above should act as a deterrent and influence miners to abandon ASM, particularly underground mining, many young people including the respondent above who recounted the events continue to engage in the activity.

Due to the many mentions of accidents that occur at mining sites, particularly entrapment incidences, miners were asked if these scenarios did not generate any fear among them to the extent of convincing them to leave their work. This is to help understand how much respondents prioritize their health. Their responses, suggest a determination to engage in ASM due to limited employment avenues and the anticipated economic gains from mining.

> Right now as it stands, we have no other work in this community to do unless we go to South [Kumasi] so we have to manage with this. The work is not good when you consider the health complications but what will you do? You have to work and use the money to buy drugs and visit the doctor sometimes. We love our lives but we do galamsey because our parents are not rich. We have to engage in galamsey to take care of ourselves and family

> too; if our parents were rich do you think we will be here? We would have been somewhere else to preserve our lives.

There is thematic consensus among miners that every occupation has some risks; and as such, respondents are of the view that the health risks peculiar to their work should not be used to demonize and discourage people from participating. They perceive death an inevitable event which can occur everywhere at any point in time. Response from a high school graduate, who has also lost a relative at the mining site sums up this view:

> *All die be die*[5] ooh… if you stay home and you are hungry, as a man you will realize you need the money so you will go and do the work. Our elders claim if you don't die at the work place you will die at where you sleep. So there are two things, you either die at your work place or you just die at where you sleep. It is true people die and during some periods it happens frequently; but what is scary about it? Here, when someone dies you try to sympathize with the person… if something like that happens you have to stop work for some time but then you go back. As for the death it can't push you away from work. No, it can't. Where else will you go when you leave the mining?... push you away to where? One of my brother's wife died at the site but should I stop the work because of that?

The above represents the defiant attitude of miners irrespective of dangers associated with ASM, particularly underground mining. The account suggests that death from mining fatalities are treated just as any other cause of death within the community.

It is however, shocking to observe that although the study respondents include miners who directly engaged in noise producing activities, such as drillers and attendants of crushing machines, noise related health problems were not mentioned as health effect among miners. Even among the drillers, the paramount risk considered is the consequences of the inhalation of dust and other

[5] All die be die is a popular statement within Ghanaian context which suggests that cause of death is unimportant

harmful fumes. Youth miners who engage in the dig and wash method could however be considered less prone to noise pollution due to the grade of tools used.

5.3 Health seeking behaviors among miners

Interviews and focus groups with miners also explored issues relating to access to health care, and the perceived quality of health care. This theme emerges from probes on how miners seek treatment for injuries due to their work environment. Within this sub-theme, the major issues presented by miners relate to proximity to health facilities, cost of health and use of community-based pharmacies. Overall, youth miners report their confidence in hospitals and clinics, and consider these facilities as good places to access treatment for work related injuries and accidents. Thus, they sort help from health facilities irrespective of challenges limiting their access. Participants indicate that recent construction of health facilities within some communities facilitate their access to health care. A participant who works at a surface mining site talks about the recent construction of a health facility in their community:

> Now we have hospitals in the communities so I and my fellow miners now go to the hospital regularly. Because of the work we do, it is important that we go to see the doctors and nurses so that they will treat the serious illness. When you have a serious cut for instance, you need the nurses to make some stitches so it is good we now have this health center here.

Irrespective of the above, proximity to health facilities is identified by many respondents as a hindrance to their ability to seek health care due to the distant location of many mining communities and sites. A female miner who resides about 10km from a primary care facility explains

> Most of us visit the clinic…you can't avoid that. You can go to the bigger hospital at Tongo or the one at Yameriga. However, you can also go to Kpatia for treatment for something like headache or body pains. The bigger hospitals are far from us so I can't go there easily for checkups.

It is important to note that most of the study communities do not have reliable means of transport to facility movements to health facilities. Thus, it is striking to notice that underground mining communities which tend to have high incidence of accidents lack health facilities and are not located within 10km of such facilities. The study participants express dissatisfaction about this situation, and are hopeful that a health facility will be constructed close to the mining site since travelling long distance to access health care is challenging. One of the interviewees reiterates his willingness to see the doctor but explains the difficulties associated with the desire for meeting his health care needs:

> I really appreciate going to see the doctor when I fall sick but as it stands, we don't have a clinic here so we have to travel to the other community, Datuku. The place is however far and you have to ride the motorbike so if you are very sick you can imagine. Some even go Bolga to hospital when it is a very serious case and that is too far when you need the help instantly.

Apparently, addressing this challenge has been on the strategic agenda of the District Health Management Team for the past two years and procedures are in the offing to start the construction of a primary health facility to ease miners' burden of accessing care during emergency. The siting of the health facility in the mining area is also informed by the high-risk nature of the mining activities. A Senior Physician Assistant at the district hospital explains the plan in place for improving access to mining communities:

> I can say that everybody knows there is a high need for a health facility in that area. The district director has put in efforts to get a clinic built in the community with health personnel instead of the current arrangement of traveling there on scheduled outreaches. They are actually trying to provide a CHPS unit there to offer some basic services such as OPD, antenatal and if possible emergency services. There are four sites there; Kejetia, Tarkwa, Obuasi and Accra…with a population more than some of the communities where clinics are being put up. So I think that hands are on board to ensure that we get a clinic established there.

The immediate problems associated with the absence of a facility as enumerated by some of the female miners include “defaulting pre and post natal visits” which also make them incur the wrath of the health workers. Besides proximity to health facilities, the financial burden related to access health services can also be a challenge for patients. Participants suggest cost as a determining factor to accessing health services in the communities. Some youth miners complain about the high cost of services and how that drain a bulk of their monies. A respondent in a FGD makes the following comment:

> We say we are doing this work because of the money we need but at the end of the day we use all the money we make to buy drugs…. sometimes if they prescribe a drug for you, you will have to use up your six months savings to buy just that drug. It is not easy at all.

Although a National Health Insurance Scheme (NHIS) which aims at reducing the financial burden on patients is in operation, about 70% of youth miners do not find it relevant to register and be covered by the scheme but rather, prefer the ‘cash and carry’ system. Some miners indicate their less frequent need for the hospital as a reason not to be registered for the insurance. Others also complain that overall the insurance does not cover most of the sicknesses they suffer and also receive better and prompt treatment when they can afford to pay cash. Confirming this, a 24-year old miner comments it is better to have the insurance to cover his family but he prefers to pay cash when he is ill in order to receive the needed attention

> As for me I have my wife and son covered; we actually renewed the insurance not long ago. But I don’t fall sick often and also I don’t want to be told the insurance does not cover my illness. These nurses know that we work at the mining sites and think we have money so when you visit with the insurance card, they won’t mind you. They will tell you they don’t have the drug to use or your sickness is not covered. And you know as a driller, anything can happen to me …. and it can be serious so if you go without money and you want to depend on insurance just imagine what will happen

> to you. So you do your work, make enough money then you can have good treatment.

In response to health problems associated with their activities, miners also patronize pharmacies. They purchase painkillers and other medicines mostly for what they perceive as minor health conditions. Indeed, majority of the respondents note that the severity of the injury or accident from the mining activities influence the choice of a health center over a pharmacy and the vice-versa. In the Ghanaian setting, it is very common to have injuries treated at home or from a pharmacy. Miners' perception of the seriousness of an accident is based on personal judgement and previous knowledge of drugs and dosages for treatment of similar injuries or sickness. According to this female miner, it is acceptable to visit the pharmacy when the patient is conversant with the use of a particular drug for a specific illness.

> Yes you may go to hospital when you don't feel well or get injured; but when you know a particular drug that cures the sickness you can also buy it from the pharmacy. Sometimes when you know that this painkiller will help you because you used it before and it was helpful, why wouldn't you get the same thing? You don't have to walk or travel the long distance to join queues at the hospital. Leave there for those who are seriously ill.

This practice is not characteristic of the above participant only; it is very common among many of the miners. This is confirmed in an interview with a pharmacy owner in one of the mining communities:

> These miners usually think they know what they are suffering from because they often experience these ailments, so they come for the drugs they need. Under normal circumstance they are supposed to explain what is happening to them by enumerating the symptoms so I decide what to give them; but because most of them have been doing this work for long and experience recurrent symptoms, they just come with their own prescription and tell me 'give me this painkiller or drug'. For the few who tell you what is happening, their usual complains have been headaches, body and chest pains, skin rashes and malaria. Sometimes they even prescribe their own

> treatment dosage…they will say 2 pills can't heal me this time so give me more.

Pharmacies are mostly stocked with drugs usually prescribed by clinics and hospitals for common injuries among miners. The common drugs are painkillers, antibiotics, blood tonic, and other injury dressing materials such as bandages and spirits. Although not formally trained, miners trust pharmacy operators to provide solution to their ailments based on the experience of most of the pharmacy operators.

5.4 Improvised ways to mitigate health and safety risks by miners

It was evident during field visits that majority of the youth miners work without appropriate personal protective equipment (PPE). Among underground workers, besides a battery powered torch light, helmets, gloves, overalls are not part of their everyday work gears. In fact, a countless number of the miners crawl into pits barefooted. Participants explain that the prices for PPEs are too high even when they are available. They complain that their bosses are not interested in acquiring and supplying PPEs to protect them. Discussion from a focus group recommends for government's intervention to provide PPEs since ASM are equally contributing so much to the national economy. Additionally, the study participants suggest that NGOs and other non-governmental actors should take interest in supporting youth miners. It is evident that the study participants are less interested in bearing the cost protective equipment. Rather, they prefer employing crude alternatives which often are riskier.

No miner was found with a mask on during site visits even though work was ongoing. Female miners are more exposed to dust as they work at the grinder for longer hours. According to youth miners, they have learnt from the more experienced miners that by covering the nose and mouth with a wet cloth or towel, they are reducing the risk of inhaling dust and such a practice is

an effective alternative of a nose mask. Although such a practice is known among the youth miners, it is often not employed. One of the female miners explains that she is supposed to wear a wet cloth or towel, but because of respiratory problem she cannot use a wet towel. She suggests that she is unable to breathe when she uses the towel. The only miner found to be using a nose mask explains why it is used

> I was not using the mask until the doctor advised I do so. He described a terrible effect of not covering my nose so I got scared and decided to get one. In fact, when I started using it I realized he was right; after taking the mask off you could see the dust particles settle on it…so imagine what happens when it enters your body without such filter

Among those who avoided working barefooted would mostly wear cheap rubber sandals. The kayas [local name for the sandals] are typically white in colour, could be buckled and perforated to allow air to the feet. They are however not durable and could not protect against injuries from the rocks which are common among the miners. One of the ghetto owners explains the behavior of his employees regarding the use of PPE, particularly the sandals, as follows:

> They have the money but they don't want to use it to buy any PPE. The first things to get when they start work is PPE… the kayas and all others. We have some people who have been working for long but don't want to use their money for the kayas….. They feel when they work barefooted, nothing will happen to them.

This behavior among miners depicts a reckless work ethic in a very hazardous environment; but on average, their reaction could be tagged as 'not bothered'. Although participants suggest a well-calculated blasting process, they confirm that a blasting process can expose them to possible harm when smoke is inhaled. According to them, the smoke is so deadly to the extent that miners are often afraid to go close to the mine even hours after the blast. When a miner who is suspected to have inhaled the smoke from the explosion is asked about his experience, he responds: "[I was] quickly given some milk to drink". According to participants,

drinking a tin of evaporated milk is a sure way of getting a quick relief from effects of inhalation of poisonous gas from explosives. The blast men are regarded the most prone to risk related to explosives. In fact, one participant who has been working as a blast man for about 6 years explains:

> We are the people who drink milk but I can't remember the last time I applied it. We were taught by our bosses to take it and it works. You don't have to even be affected by the explosive….as soon as you come out of the pit, you are encouraged to drink it.

Other fizzy drinks such as 'soda tonic' and energy drinks are also rampantly used among miners to curb the various bodily pains. According to one of the locum boys, consuming "quinine tonic helps to cleanse the system" after working underground is a good practice among miners. Miners need not be affected by any visible harm, a quick gulp of this tonic "checks your heart beat and helps you to relax before engaging in any other activity". Whilst the perceived contribution of milk and other carbonated drinks towards the reduction of heart problems are not scientifically backed, miners continue to use them because of the needed relief they profess to have when consumed.

5.5 Conclusion

Despite some economic benefits to participants ASM is associated with many health risks. Youth who are engaged in it are often exposed to the several occupational hazards. Overall, youth miners are aware of the risks associated with their work and even though they explain that these could have grave consequences for their health, such knowledge is not translated into concrete actions which minimise health risks. Awareness of the risk do not prevent the youth from engaging in ASM. The chapter demonstrates that behavioral factors and perceptions of risks contribute to exposure to health risk hazards. To reduce the rate of fatalities and injuries at mining sites, much

improvement in miners' attitudes or behavior towards risk is required. In general, there is a dilemma among youth miners regarding prioritising their health.

CHAPTER SIX

PERCEPTIONS ABOUT ENVIRONMENTAL CONSEQUENCES OF ASM

6.0 Introduction

With about a 100 million people living in (artisanal) small-scale mining communities across the globe, environmental problems caused by these activities could have profound and widespread effects on populations (World Bank, 2013). By far, the most noticeable implication of increased ASM activities in Ghana is its negative impacts on environments in mining communities. Due to the deleterious ecological effects of ASM in a number of mining communities across the country, several stakeholders are calling on government to take steps towards a complete halting of ASM activities. So far, government efforts in responding to these calls are deemed unsatisfactory by sections of the public because the environmental problems associated with ASM persist in mining communities. This chapter highlights the perceptions of ASM operators in terms of the environmental consequences of their activities. I present narrations from study participants in three sections. The first presents perceptions of ASM impact on water resources in the study communities. This is followed by a discussion on the impact of ASM on land degradation. Finally, the chapter presents results on how ASM impacts sanitation in mining communities.

6.1 Water Pollution and ASM

The impact of ASM on water quality has attracted extensive media report in recent times. Water is not only relevant in the mining process but equally a vital resource for (other) members within the mining communities. During field visits for this research, it was noticeable that rivers and streams located in mining communities serve as both a source of drinking water, performing household chores including cooking. At the same time, these water bodies are an important for the miners in their gold washing process. It is particularly intriguing to find that many miners prefer

to wash in the river compared to a few who use trenches and shallow pits to wash soil for gold nuggets. In the following sub-sections, I present evidence of how specific ASM practices pollute water bodies and strategies miners adopt to cope with this development.

6.1.1 Ore washing practices and water pollution

The findings show a divergence in the washing methods used by surface miners and the underground miners although water is the only resource used in the washing process among the two groups. Among surface miners, water is collected from the rivers and conveyed to designated sites to commence the washing process. Mostly, female miners in the group are tasked to fetch the water as part of the gender division of labor which exists in ASM. The leader of a group of surface miners elaborates on this arrangement:

> We have the river over there so we have to go there to fetch some, and then bring it here to wash the ore. Since the girls can't dig like we do, we ask them to fetch the water for us; and they help with the washing too. I think this arrangement we have here is good because otherwise we would have to carry the load [ore] to the rivers to wash.

Miners are confronted with the option of either collecting water from rivers to wash gold ores or carry loads of ore to river banks for washing. According to respondents, the former is considered more convenient and less cumbersome. Participants reports that this practice, saves them energy since the digging itself is tiresome. This practice according to them do not cause direct pollution to water bodies in the community. Hence, surface miners vehemently oppose a generalization of all ASM miners as perpetrators of water pollution. A miner in a FGD expresses this opinion as follows:

> You can't say we are all the same or we are like the other people who are washing in the rivers. As for us, we do no harm to the river nor the people who use it. In fact, all of us use it so why should we pollute the water?

Miners are aware of the possible impact of washing ore in water bodies. For this reason, there is a general consensus and conscious effort among miners to avoid polluting water bodies; bearing in mind the usefulness of these water bodies to their personal needs. Further investigations reveal that youth miners had attempted to wash ore in river bodies but the practice was immediately halted due to stern warning from the Tindaana. One of the key informants who works with the Tindaana and had two sons engaged in ASM reports that:

> Some galamsey boys wanted to wash in the river but Tindaana has warned them not to do so because that will pollute it… so they have to fetch the water and use it at their work area. We need to preserve the water because that is all we have. The animals also drink from it and if it is not good, then they can die from drinking from the river.

At the Tindaana's compound, he confirms this caution he gave and explains his responsibility to the community includes protecting the environment. His position as the traditional leader requires of him to instill an attitude of preservation of communal resources among his subjects and also sustain amicable living among same. He describes how the destruction of water bodies could cause conflicts among community members

> If someone loses his animals because they drink from the polluted water, that could be a source of conflict between the families of galamsey boys and the owner of the animals.

Examining the relevance and efficacy of this caution, youth miners express their support and meticulous adherence of this caution to be linked with customary demands. Overall, youth miners obey the directive as a sign of reverence to the authority of the Tindaana as he wields the uttermost power over them. One of the participants, in an attempt to tell the degree of the traditional leader's authority retorts that "here when Tindaana gives an order, who are you to disobey?". Miners indicate that customary rules enacted and enforced by the Tindaana have no allowance for

disobedience and any sign of disrespect especially among young people as this could lead to hefty punishments including fines and banishment from the community.

Despite the afore discussions, youth miners are not oblivious to the fact that their counterparts in neighboring mining communities and beyond, even across the country engage in ore-washing in rivers, spurring the increased agitations in some host communities especially in recent times. During a group discussion, one of the youth miners incensed by discussions revolving water pollution caused by ASM retorts:

> I know what you are talking about; this happens in some of the mining communities around and even in other places in the South….and that is making people complain that galamsey is spoiling the rivers.

In agreement to reactions from mining communities across the country against ASM activities due to water pollution, surface miners concur that washing ore in rivers is a dangerous practice that must be stopped. Explaining further why they think the practice is destructive especially because it reduces the availability portable water. The respondents who participate mainly in surface mining are concerned that the increasing classification of all ASM miners as people causing water and environmental population is erroneous and could lead to a general ban of their livelihood activity.

During the FGDs with surface miners, participants mentioned some of the communities that are culpable of polluting water bodies. This pollution, they claim, is majorly a result of mercury use. With a finger pointed at the location of one of such culpable communities, a participant angrily expresses the following:

> Go over there…the bush area! and you will see what they do with the river; it is not us! You go and see for yourself and you will know that as for us we are not doing anything wrong.

Following this lead, two sites which were reported as places where ore washing in the river was practiced were visited by the research team. It emerges that these sites indeed wash ores in the river and both are underground mining sites. Generally, underground miners indicate that water resources within their areas of operation are resources necessary for meeting their primary goal — i.e. finding gold nuggets. This notion is exemplified in the following comment made by an underground miner:

> Ah! but we are here for gold and not for the water. We need the water for the work and that is what we are doing … so you can say we are polluting it.

In the case of underground miners, it is clear that they have minimal concern about the impact of direct washing of ore in water bodies. This group is focused on the primary motivation for their participation in ASM as expressed by this participant:

> I am doing this work because I want money. If I think too much about how galamsey is polluting the water I can't do this work. I want money to feed my family and so I have to do this work.

This depicts the mindset some of underground miners concerning the implications of their actions on the environment and host communities. It demonstrates a certain level of insensitivity to the environment and a neglect of the dangerous environmental problems associated with their activities. Instead, these miners focus on the financial gains from the arduous work.

It is important to note that participants acknowledge that some community members continue to rely on the polluted water for bathing, cooking and performing household chores. During an interview session with a participant who had about 6 years of mining experience in the community, some girls carrying buckets headed towards the riverside passed by and that charged the respondent to tell some of the uses of the river by miners and the community members and the effects it has on its users;

> Ah, you see those girls over there? They are going to collect some of the water. They cook with this water and we buy their food…sometimes they don't even have to wait to cook with it, others just fetch and drink it.

Some respondents report skin diseases from bathing in polluted water, and bowel disorders are common among consumers of the polluted water. Respondents suggest that overall, it is impossible to avoid any form of contact with the polluted water because "satisfying basic needs such as eating, drinking and bathing relied on water from the river due to the absence of portable water in the community.

It emerges that the extensive pollution of rivers in some mining communities have resulted in residents increasing reliance on other sources of water. From the interviews, some respondents indicate they rely on boreholes and sachet water for consumption purposes and undertaking chores due to concerns about polluted rivers. In a key informant interview with the District Chief Executive (DCE), he indicates that government together with NGOs are working together to provide portable water to mining communities through the drilling of boreholes. For example, he indicates 33 boreholes have been drilled in the district including the Bush (one of the communities with underground mining activities). He however suggests that communities may still have concerns about water;

> You see people will continue to talk about water issue because it is very important for life. We have sunk so many boreholes for numerous communities in the district as part of our WASH project which falls under the health program. We realize that sanitation issues in the district is appalling so we noted that to change things we needed to help the people with portable water.

Respondents indicate that they rely on sachet water (and sometimes bottled water) for drinking and cooking. Bearing the consequence in mind, one of the participants states his willingness to minimize potential health problems has led to his decision to use sachet water

> You see, you can easily fall ill with this kind of work so why will I intentionally do other things to suffer later? It is important we take care of ourselves and stay healthy when we can so I use sachet water.

Units of bagged sachet water although not highly priced, becomes expensive when needed in large quantities. For this reason, miners report that sachet water is used mainly for drinking purposes. They lament on how difficult it is to use sachet water for other domestic chores.

Speaking with staff at the Minerals Commission (MC) and the Environmental Protection Agency (EPA) regional offices, water pollution in these communities did not come across as a critical problem observed by the officers. The District Director of the MC describes the basic responsibility and mandate of his office to include ensuring mining activities are carried out without creating "much environmental harm to the miners and the host communities". He continues that "the role of the MC is to see to the regularization of mining activities within the district and also the monitoring and supervision of mining operations". This role, as mentioned, did not seem to include preventing pollution of or safeguarding natural communal resources such as water bodies. At the EPA office, the Project Officer refers to the "giving of approvals to projects that are considered to have less significant impact on the environment" as the sole mandate of the agency. Counting mining as one of the operations that demands the EPA's approval, he further explains the field assessment process before a concession is rewarded

> Initial visit to proposed concession site is made to solicit baseline information especially on sensitive features such as water bodies, railway lines and other social amenities. We consider the water body a critical resource to the community since members use it for domestic purposes; thus, an initial report of the quality of the water body is requested from the miner or concessionaire.

Bearing in mind the possible effects of ASM on water bodies, the EPA's demand for a pre-assessment of the water quality levels as part of the documentation process, is to "enable the EPA identify the effects of the mining activity on the water parameters after some time when the

operations have actually began". Unfortunately, the EPA's supervisory role especially over the destruction of sensitive features is limited as the agency is only moved to act after promptings from community suggest the depletion of these sensitive features. "We make sure they [miners] do all these and then we study it so that when they start their operations and the community is agitating we can actually tell whether they are the causes of what the community is kicking against or it is just from the preconceived perception the community has about mining activities. This helps us - the regulators, to see exactly what is going on to appropriately intervene" he states. So far, the communities under investigation have however not witnessed angry chants from the community members to suggest their displeasure of the negative effects of mining activities on their water bodies despite the obvious depletion. The EPA notes that problems from the mining sites in this community have not included the pollution of the river.

6.2 ASM induced Land Degradation

Another critical environmental problem associated with ASM is land degradation. Many land based activities including agriculture are affected by several years of digging and removal of the surface cover of land due to ASM. Interactions with miners on the impact of their activities on land degradation produced two broad categories of impact based on the method of mining operation. In the following sub-sections, the perceptions of ASM on land degradation among surface miners and underground miners are presented.

6.2.1. Surface miners and land degradation

A large number of surface miners explain their work have no or minimal effect on the land and its fertility. This argument is made because ASM activities are undertaken in some segregated areas. They argue that land in the mining communities are primarily used for agricultural purposes.

Participants further explain that prospecting for gold is usually undertaken on abandoned or uncultivated lands. A respondent during a group discussion makes this clear by stating:

> We mine at the bushy areas unless there are farmlands with gold deposits; and because the places are rocky and always weedy you will have nothing when you farm there.

A further investigation however reveals that farming and mining activities are sometimes practiced on the same piece of land depending on the season. The long dry season experienced in the region is mostly recognized as a desirable time for mining, youth miners claim. During that period, landowners are willing to lease their lands for ASM activities until the rains set in. They however, quickly request for their lands back to farm during the rainy season; and miners generally have no option but to give up their work on the leased piece of land. During one of the group discussions, a female participant explains that "if the rainy season begins, they [landowners] ask us to leave their land because they are going to farm". This arrangement is accepted among the miners and landowners hence there is no conflict when land is taken back for farming purposes by its owners. According to the miners, in order not to stay out of work, they hand over one piece of land but immediately look for other locations to mine.

There are however some variances in the arrangement between miners and land owners; in some instances, landowners leased the lands to prospective miners at a fee which is paid either in cash or kind. A female participant who witnessed such transaction between her parents and a landowner says "sometimes you will have to pay some money to the owner or give him some of the load you extract when you work". The sharing of minerals extracted is however an extra gesture of appreciation from the miner after cash had been paid to the landowner. Cash payments by miners nonetheless lead to some negative attitudes. Describing the reasons behind some open pits which are left unattended after a mining closure, one of the male miners discloses that "the landowner

collected money from them [the miners]". Miners who pay cash to landowners do not feel obliged to reclaim the land because they expect their payments to cover any destruction caused.

Participants confirm that they engage in reclamation practices. The refilling of pits with top soils is considered a reclamation method by miners as well as community members; and this contributes to the perception that ASM has no adverse effect on the land. A community member expresses his sentiments on the consequences of ASM on community lands by supporting this idea of reclamation;

> It is not destroying the land because when they finish digging and bring up the loads, after all the work they have to cover the pit for the land to be used for farming again during the rainy season.

Some respondents are unhappy about argument from the public that ASM activities result in soil infertility. According to this group, agricultural yield, has over the years drastically reduced because soils lost their nutrients long before the inception of ASM activities in the community. Poor soil fertility and low agricultural yield is therefore not a consequence of ASM on the land. One of the group leaders said during a group discussion:

> You can't blame us for any poor agricultural yield. For sometime now we have been experiencing this problem…even before we realised we had gold on this land. The gold business therefore cannot be considered as the reason for our agricultural problems.

In fact, some argue to buttress an earlier suggestion that land infertility has necessitated the use of it for ASM activities. "We are rather mining because the land is not good for farming", they claim.

There are however, some miners that show blatant disregard for the land and agree their focus is on extracting the gold, any side-effect on the land is disregarded. A 22 year old miner with five years mining experience expresses his perception on their activities on the land:

> We are doing this work because of the gold and not the land… that is what we want so we take the gold, and the land remains.

Some community member respondents however hold a different opinion and argue that ASM indeed has some negative effects on the land. A female key informant who has two of her children involved in ASM activities opines that "….it destroys the land but as for that we don't have a problem with it". Similar to this view, a miner recalls that there are some community members who perceive ASM as destructive. He laments "some people say we are destroying the land"; and indicates that in such cases the land owner is compensated if they still permit the use of the land by the miners. He goes on to narrate an incidence where a land owner accused his group of destroying his land with ASM activities and therefore requested for compensation

> We don't have conflicts with the land owners regarding destroying the land…that is very rare. But I remember one day an old man came here and said we have ruined his farm land so everyone here should pay some amount. We agreed to inform everyone who mines here so we could decide how much each miner contributes but he never came back.

Also, there is an argument about which group of miners' activities were more deleterious to the land – surface/dig and wash miners and underground miners - with the former accusing the latter as majorly culpable. These accusations stem from the level of machinery used by underground miners. Surface miners regard underground mining as more destructive as explained by a surface miner that "because they use all these heavy machines to enable them dig deeper they end up destroying the land". During one of the focus group discussions in the surface mining community, youth miners directed the research team to visit underground mining communities "to do the comparison". They described underground mining operations as "intense" and "serious cause of environmental destruction".

6.2.2 Underground miners' perceived impacts of ASM on land degradation

During interviews with underground miners, they grudgingly argue that their work is acceptable and elaborated that their activities are performed at locations on the outskirts of the communities. This assertion on the location of mining sites is confirmed as one of the key informants reveals that land is apportioned for both farming and mining activities with the latter operations ongoing in the "bush where no one farms". Mining sites are located at areas specifically allocated for mining and do not disrupt any other activities. In fact, settlements in these areas have sprang up out of the ongoing mining activities. By stating that their work is acceptable, youth miners infer the support received from government which is exhibited by the involvement of the District Assembly (DA) as well as the MC and the EPA at the various stages of their operations. One of the respondents expresses this view in the statement below;

> … but all that we are doing here is legal; otherwise the staff from the Assembly and the other agencies that give the licences will not come here to collect money from the ghetto managers.

Miners recount that intermittent visits by tax-collecting staff from the DA to the mining sites demonstrate the legality of their work and the recognition of such by the national government. They claim that devastating ecological problems caused by their work would have been a good reason for the government agencies to stop their operations. The continuous issuance of licences from government agencies, collection of taxes and the unceasing mining work therefore suggest less environmental burden to host communities. A leader of one of the groups, agitated by the land degradation insinuations usually pointed in their direction said;

> All these government people come here you know; they come to check what we are doing here. Even before you start the work, you have to register with them and obtain licence so if it is very deleterious as you people claim, why are they not stopping us?

Also, some responses from miners project that ASM activities flourish and will continue because of the rewards the government receives from the sector. One of the male miners was certain that the government will not halt ASM activities due to the heavy financial contributions from the sector to the national coffers. “This work generates a lot of revenue for the government, do you know that?” he rhetorically inquires. “How do you stop something that brings in money to undertake other projects in the country?” he continues.

Furthermore, almost all miners interviewed report that complaints about ASM activities and its connection with land degradation usually do not emanate from members of the host community. According to participants, these sentiments are often aired on radio by non-community members and panelists on talk shows. Miners complain that radio programs by media houses in the capital of the region resort to discussing the expansion of ASM in the region and the destruction of land and other resources usually come up as the negatives of their work. When asked whether these sentiments expressed via the media and specifically radio panelists, had any influence on their activities, many underground miners are appalled by such suggestions as exemplified in the following quote:

> Ah what is their problem? …. okay, their problem is we are [spoiling] the land but if I stop will they give me food to eat? They can’t feed me and my family so it is better they keep quiet.

About twenty-five out of the thirty miners interviewed in these communities were not bothered about the opinions voiced by the public even though the latter’s views are not received well by the miners. Per their speculations, these sentiments expressed by non-community members is a gradual move to stop ASM. The respondent above for instance interrogates the accusers’ ability to provide for miners’ basic needs when the latter become jobless. Miners are insistent on the

usefulness of their work to first themselves and their families, hence any move to halt their activities is unacceptable for them.

There is however a common belief among underground miners that contributes towards their defiant stance. Miners hold the view that generally, exploited lands can be reclaimed for other productive ventures even after several years of mining and this is not hindered even with the current level of mechanization in the operations. This view held among miners is actually supported by the MC. According to the District Director, "environmental scholars proclaim it is possible to reclaim the land so I believe it is…". He alludes that his research conducted into the matter reveals this suggestion provided by some environmental scholars:

> Well environmentalists will tell you that as much as possible the land can be reclaimed to near its former state or better still for a more useful venture based on consultations with the stakeholders involved which also include the host community.

During stakeholder consultations, an agreement is reached on exactly what mined lands can be used for, which in most cases is for the benefit of the community. The only important factor during these negotiations is that all stakeholders must agree to the plan. The host community being a crucial stakeholder in this case is to direct projects considered to be of economic importance to the lives of its members. A neglect of the concerns of community would usually result in a deadlock in project development which then portrays ASM as a very depletory sector. So "depending on how you do it, I think it can be done" said the district director of the MC. Explaining further on this argument, he gives the scenario below;

> Let's say you excavated an area and the people feel that converting that area into a fish pond or some other thing of economic value it can help boost their livelihood and better their lives, why not? You just have to agree with them on what they want and if that is feasible, you do that for them.

Besides reclaiming land for other life enhancing projects in accordance with community requirements, according to the director, per the MC's regulations, miners are requested to refill mined pits after their use. This is required whether the community agrees to reuse the area for another activity or not. He explains,

> Let us put it in this contest …if I acquire a mining license and get to the community, I have to work within the stipulated work framework. By that I will know the responsibilities I have that after digging deep into the earth and closed my mining activities, I am supposed to refill it and re-vegetate it as much as possible. Unless the community or upon other considerations you realize that this pit can be redesigned to be stocked with some fingerlings to help address other socio-economic issues that the community faces, then it is your responsibility to refill it and grow some plant species that are very common in the area. Sometimes you can only bring it back to the nearest and not exactly to its former state; but that is also good so that all is not lost after an area is mined.

It is the reserve of the community to decide on what these lands should be used for. This arrangement he however continues to explain is for the underground miners and considered miners engaged in dig and wash mining as "local people doing their own thing and since they are not registered, they are not reached by the MC". Concessionaires of the underground mines are duly recognized by the MC and so the officers "try as much as possible to give the miners the necessary guidelines" required for their work. He is of the view that pits dug by surface miners cannot be reclaimed because "they destroy the top soil and thus cannot support vegetation even after the closure of mining.

6.3 ASM and environmental sanitation

In communities where miners practice the dig and wash method there is hardly sanitation problems at mining stations and the community at large. Environmental sanitation conforms to the general upkeep of the community because these areas are located within the reach of households.

The case of underground mining communities on the other hand, is different. Visits to the mining sites reveal unhygienic practices among underground miners. Surroundings of various mining shelters and homes are littered with plastic bags and pervasive heaps of garbage. Mud-constructed basins and trenches used for gold-washing by miners are filled with unwholesome water. Miners were questioned about their sanitary behaviors and how that contribute to harming the environment; and the repercussions they perceived this has on communal health.

Miners are generally not perturbed about the environmental challenges caused by their unhygienic practices of littering for instance. Responses suggest a lackadaisical attitude towards keeping communities clean and this attitude, to a large extent, is created because of the location of the mining sites. Miners initially expressed minimal attachments to mining settlements because they are sited on the outskirts, even when these specific locations are under the jurisdiction of a larger traditional area of which they belong. The Chairman of the Local Miners' Association provides the following explanation;

> Nobody really owns this place or comes from here you know? As I speak with you, I am a native of this traditional area [Gbane] and the whole of this site is under our chief's rule but until some gold deposits were found here in the 1990s, it was a deep forest. People only walked through it in search of very important plant species needed for medicinal purposes and the shea butter tree too. So, this place that we mine is no hometown for anybody per say. The only ones who call this place their hometown are the very young ones who were born here.

The above account is repeated by many participants who work in underground mines - who have received oral histories of the origination of these mining settlements, and two other key informants. In all of these accounts there was an agreement that for a long time, mining areas have not been regarded as part of the core of the community hence the neglect of hygienic practices on those sites. In fact, miners argue these mining settlements have been unkempt before they joined

in the work and do not feel obligated to keep it in any better form as exemplified by the following quote:

> Well there is nothing really that I can personally do about this; they have been filthy for all this while and I came to meet it so.

According to miners, "since no one owns this place, everyone is permitted to do as they please"; no one is held accountable for the unsanitary environment. A respondent emphatically states "here nobody is responsible for cleaning the environment so we dump our rubbish anywhere and anyhow".

These assertions suggest either the absence of leaders whose authority in the communities is revered or a total disregard of environmental sanitation among the leaders. Nonetheless, the pre-eminence of local traditional leaders in these settlements is obvious as the research team was introduced to them. In one of the communities, the paramount chief had relinquished his authority to his younger son who lives at the mining area for closer supervision of miners' work. One of the ghetto owners, confirms the presence and authority of local leaders and dismisses the reports by some miners that community members are not accountable to any authority in issues related to the environment. He claims the younger chief still wields the authority to rule in every facet of the community, "… only that perhaps he has not made the sanitation issue his priority". This comment then buttresses the submission that sanitation has been relegated by all members of the community including the leaders. He was quick to add though that miners need not wait to be instructed on hygiene before they choose to engage in good practices.

About twenty-two out of the thirty miners interviewed in these communities recognize effects of some of their insanitary behaviors. A male participant, for example, tries to draw a link between ASM activities and malaria that are experienced frequently in the community. He says,

> I think it is our work that is causing the diseases; or you don't believe so? The place is dirty because we dispose garbage anyhow, and that can cause sicknesses. Malaria for instance… oh! as for that one it is very rampant. Almost everybody in this community gets infested by malaria. One of the guys is reported ill and I will not be surprised he is suffering from malaria. I had my own share just last month.

He continues "because of the rubbish we have all over the place, mosquitoes breed easily here. And since some of us often sleep in the open-space, you should expect malaria at all cost". The knowledge of excessive garbage acting as mosquito breeding grounds and its link to malaria epidemic among these miners have however not caused any change in behavior. The respondent above affirms his participation in the continuous damage to the environment by saying "oh yes I know it is not good to throw rubbish about but that is what we do here. Even if you clean, another person will litter so we are all in it". Miners seem unlikely to initiate better sanitation practices and indicate that littering will continue because they do not believe other community members will be willing to join in such an initiative. Meanwhile, "there are no bins for collecting the garbage so where do we start?" a respondent asks.

Some of the youth miners also suggest different factors contributing to the malaria infestations. They complain that besides their littering behavior, their bushy surroundings could not be ignored. One of the participants indicates: … "but don't forget that this place is still bushy and that is fertile for mosquitoes, so that also contributes to the malaria problem". A participant explains how mosquitoes prevent them from visiting one of the boreholes situated in the community even though they like the quality of water from this borehole. They are however mindful of a possible malaria infestation. She laments whilst giving the account below

> You just go to the other borehole project over there. The water there is good but we are often afraid to go there because of the mosquitoes. You will be immediately infested with malaria should you stay there for an hour.

The Chairman of the Local Miners' Association agree to this relationship drawn between the bushy surroundings and mosquito invasion in the communities. He recounts that, in 2014, malaria became endemic in the community and that caught the attention of an organization which resolved to assist in curbing the problem by providing spraying services to the entire community. According to the chairman:

> Some people from a certain company came to me. I think I heard they were from AGAMA. They came to this very house…my house and asked that I inform the community about their intention to come the next day to spray the whole area. They requested that people move all their belonging from their rooms and pack them outside.

The mosquito spraying exercise as narrated by the key informant above, is also recounted by some youth miners. According to them, they heard of the services of AGAMA in other communities, hence when "Chairman informed us of this, we were in high expectation as everyone thought it was a laudable thing to do for us…. everybody packed all his belongings from the rooms as instructed". Unfortunately, the anticipated help was never received from the organization as the community waited in vain on the agreed date. The chairman, frustrated by the actions of this organisation says,

> We waited and waited till 1pm on that day and they were still not here. The next day, they still didn't come…up till today as I speak with you, they are yet to come. Maybe we are not part of the mosquito spraying exercise after all.

He goes on to discuss a general concern among the miners on the neglect of ASM mining settlements or miners by government in providing some assistance to them when needed. He questions: "so what is wrong with us also receiving some of the help from government or other organizations?". He was optimistic about the contribution of ASM to the government by stating

that “the way we work here we are also helping the economy”; and that should be a good reason to receive assistance when needed.

The risk of malaria is also associated with unattended trenches which had been used during the gold washing process. Although some of these trenches were observed during field visits, one respondent reports that male miners are the most culpable to this practice. “The boys are fond of doing that; they leave the pits filled with the muddy water after washing the gold and you will find a swarm of mosquitoes hovering around the place the moment the sun sets” she said. Male miners however justify this behavior by stating that this is intentional. A 24 year old miner, who was found washing for gold in such trenches before interviewed mentioned his unwillingness to distill the trench “for fear of loosing some gold sediments”. With almost 6years of experience in ASM, he further explains “it is possible to have some of the gold deposit beneath the trench so it is good to let everything settle, collect it and rewash at a later time so you have enough from your work”. In the bid to maximise profits, youth miners ignore the contribution of such practice to malaria infestations in the community.

There are also some miners who believe it is the responsibility of the government to keep their community clean. This responsibility, they claim, should be upheld due to the revenues the government receive from the ASM sector — specifically through taxes collected from their ghetto managers and concessionaires. A respondent insists that:

> The government collects a lot of money from our bosses so why can’t they pay people to come and clean this place for us? They are supposed to come here and clean up.

Some participants were adamant about participating in cleaning their surroundings as exemplified by a participant who says “we don’t have time to be cleaning this place”. They regard

time invested into having a clean environment as a wasted one since that time could be used to mine some ore. A male participant blatantly states,

> Considering the hard work we do here, there is no time to do such things. Every time you wake up you only think about how to go into the pit and get some rocks. No time to waste at all.

Youth miners are more inclined to placing the responsibility of keeping a hygienic and safe environment on another agent. By inferring that responsibility on the government, youth are requesting the services of a waste management company in the community; with the government bearing all the costs involved. "Why do we have Zoomlion[6]"? one of the participants asked during a focus group discussion. "It is their work, so government should pay them and ask them to clean this community for us" he continued. Overall, miners agree they conduct their work in an unsanitary environment. Considering that malaria is rampant in these mining settlements and yet no clear vision of how to keep the communities clean, a respondent expresses his fear by stating "we are not safe from diseases at all with this kind of environment".

6.4 Conclusion

The findings in this chapter support the argument that there are a number of environment challenges experienced in mining communities and by miners. These challenges although experienced by almost all mining communities vary across mining communities and the level of damage also varied. The most important determining factor in this discrepancy is the method of mineral extraction used. Dig and wash miners, are for instance less culpable to water pollution as compared to underground miners who prefer to wash in river bodies.

[6] Zoomlion Ghana, is a locally-owned waste management firm working in collaboration with the government in ensuring the prioritization of environmental sanitation in the country (Zoomlion Ghana, 2017)

This chapter provides an enhanced exposition on the perceptions ASM miners hold on their work and its relationship to environmental and communal health problems. Their responses as recorded here, suggest their agreement to the idea that ASM is not a problem-free sector; especially the relationship between their work and community health concerns. However, most miners believe they are not culpable to grave problems such as water pollution and land degradation which are often the basis for a call to government to stop ASM operations. Overall, miners refer to the call to the general halting of their work due its deleterious ecological challenges as unwarranted. According to the participants in this research, their activities do not destroy land and the lands can be reclaimed after a mining closure. Miners insist that problems posed by ASM activities in other communities must be handled on a unique case-by-case basis. More so, community members within the mining areas generally did not express negative sentiments against their activities or operations.

Also, miners are aware of the poor environmental sanitation in their communities as well as conversant with the community health implications. They are aware that malaria infestation for instance can be endemic; but prefer other agencies took up the sanitation challenge rather than themselves. Miners, instead of adopting hygienic practices, rather call on the government whom they refer as a high benefactor of the sector to invest in the sanitation aspect of ASM. The persistent environmental and community health challenges associated with ASM are pervasive in mining communities. Left unresolved, these could pose challenges to ASM's role in any rural livelihood transformation and development efforts.

CHAPTER SEVEN

SUMMARY, DISCUSSION AND CONCLUSIONS

7.0 Introduction

In this chapter, I provide a summary of the dissertation. First, the salient issues in each of the six preceding chapters are briefly presented. This is followed by discussions which draw links between the study findings and existing conceptual and theoretical debates. Specifically, I link the key findings of poverty and the context of lack of alternative livelihoods to broader theoretical discussions about development, the livelihood approach and de-agrarianization. The next section also links another key research finding on occupational health risks to the broader discussions about health risk perceptions ongoing in the literature. Also in this section, I contextualize how ASM activities in a fragile ecological zone fits within broader concerns about climate change, environmental degradation and population health concerns. The final section contains concluding thoughts and remarks. Specifically, the study limitations, recommendations and direction for future research are presented.

7.1 Summary of the thesis chapters

Chapter One provides the background for this research. It discusses how ASM has become prominent in rural communities of some developing countries as teeming numbers of unemployed youth seek livelihood opportunities. The objectives of the research are presented in this chapter. Chapter Two of this dissertation focuses on literature review and the theoretical underpinnings of the study. The chapter situates this research within the broad context of the livelihood approach and discusses the various livelihood strategies and options usually employed by rural dwellers. In so doing, the chapter discusses ASM as option used by rural dwellers within the broader trend of increasing de-agrarianization in many locations across SSA. The Chapter then proceeds to discuss

the occupational risks and environmental concerns usually associated with ASM. Chapter Two positions this research within health geography whose tenets allow for inclusion of subjective interpretations of health and emphasizes the importance of place on health. The chapter concludes with a brief discussion of risk perception and how that is shaped by place-based or environmental factors and an individual's subjective appraisal of these factors based on social and cultural contexts.

The methods adopted for addressing the research objectives are presented in Chapter Three. The chapter starts by presenting a justification of why a qualitative research approach is best suited for addressing the objectives of the research. Specifically, since the motivations, perceptions and experiences of youth miners in northern Ghana remain largely understudied, the methods available in qualitative methods allow for detailed exploration of their experiences. The chapter provides details of the study area context, the target population, participant selection processes and data collection approaches. Detailed descriptions of the main methods of data collection — semi-structured interviews and focus group discussions — and analysis are presented. The chapter concludes with a discussion of how rigor was ensured and provides information of ethical considerations of the research.

Chapter Four is the first of three results chapters. It addresses Objective one which focuses on the motivations for youth participation in ASM. The chapter relies on narratives from participants to illustrate the three main factors which are collectively responsible for the increasing number of young people engaged in ASM in the selected mining communities. Among these factors, poverty at three distinct but interrelated levels (community, household and individual levels) emerges as the most important motivation for youth participation in ASM. Lack of alternative employment opportunities as an incentive for participating in ASM is also presented.

The final section uses quotes from participants to illustrate how proximity to gold-rich locations has galvanized support for youth participation in ASM at both community and household levels.

In Chapter Five, I present results on youth miners perception of occupational risks associated with ASM. The first section provides a description of the working environment of ASM and the methods used in extracting gold. This helps provide a context for understanding health risks perceptions and experiences among miners which is presented in the next section. The chapter also touches on health seeking behaviors of miners and concludes with ways in which miners attempt to reduce the health and safety risks associated with their work.

The final results chapter — Chapter Six — presents findings on perceptions of environmental consequences of ASM among study participants. The three most dominant themes which emerge relates to water pollution, physical land degradation and environmental sanitation concerns. The chapter demonstrates that ore washing practices are largely responsible for the water pollution caused by ASM operators. On land degradation, it emerges that perceptions of ASM environmental impacts varied based on whether youth were engaged in underground or surface mining. Finally, perceptions about how changing working and living arrangements due to ASM are impacting community sanitation practices are presented.

7.2 Contextualizing poverty incidence and livelihood diversification

7.2.1 Reflections on persistent poverty in the study area

One of the most important and central conceptual underpinning in this study is poverty. As one of the poorest regions in Ghana, the UER has been at the wrong end of national development policies intended to reduce poverty and boost economic growth from colonial times to the present (Songsore, 2003). For example, during colonial times the Northern Territories (which includes present day UER), received no investment intended to boost economic development. Instead, the

area was used as a labor reserve for meeting the labor needs of the mining and cash crop industries in southern Ghana. After independence, development policies implemented by various governments including the establishment of economic growth poles in the 1960s through to the adoption of structural adjustment programs in the 1980s and 1990s did not benefit the region and further exacerbated inequalities with other parts of the country. Consequently, residents of UER (including those in rural locations such as the study communities) are among some of the poorest people in Ghana (Whitehead, 2006). Even in recent times, when Ghana is hailed for its good economic performance which placed it among the lower-middle income countries, these economic gains are not evenly distributed across regions and localities (UNDP, 2014). For instance, while rural development and urbanization have led to some level of poverty reduction in Southern Ghana, the same cannot be said for Northern Ghana. While the number of poor declined by 2.5 million between 1992 and 2006 in the South, the figure increased by 900,000 in the North (UNDP, 2014). This development trend is aptly described by the World Bank in its statement that Ghana's success story in poverty reduction and reduced inequality is the success story of its Southern and urban areas only (World Bank, 2011). The existence of these inequalities acts as propellant for the soaring number of youth in ASM activities not only in the research areas but the country as a whole. Nyame et. al., (2009), agree that these inequalities even contribute to migratory patterns within the ASM sector. According to them, there are numerous accounts of movements of local residents in Northern Ghana to mining camps in Southern Ghana in search of gold. Miners and non-miners engage in transitory mining – move from one mine to another – and by so doing are able to forge strong bonds with the host communities and co-miners.

The long history of development deprivation due to dysfunctional policies contributes to entrenching poverty and offers some explanation for the current high incidence of poverty in the

region as a whole and the study communities in particular. Since ASM generally proliferates in poverty-stricken areas as mentioned earlier in Chapter 1, and people of the UER experience high levels of poverty, preventing them from ASM activities which promise a more stable income could be unachievable. Furthermore, due to the pervasiveness of poverty within the UER and among study communities, food insecurity is rife (Hesselberg, J., & Yaro, 2006; Quaye, 2008). In many instances, food insecurity is a manifestation of the poverty. Engagement in ASM is recognized as an important conduit for escaping food insecurity by earning a regular income.

Admittedly, food insecurity is a result of a combination of factors including poverty, access dynamics and unavailability of food due to a decline agriculture production. The perception among participants that their food insecurity situation is also influenced by dwindling agricultural production corroborates previous research in the area (Laube, Schraven & Awo, 2012; Tambo, 2016). This trend is attributed to climate change and its associated impacts including reduction in rainfall amounts, unpredictable rainfall patterns, reduction in vegetation cover and decline in soil fertility. These factors are particularly noteworthy because agriculture in the UER relies on natural rainfall and the use of rudimentary tools with very minimal farm inputs. Although there have been efforts in the past to establish irrigation dams in the region, this attempt is touted as inadequate due to the dominance of farmer-driven irrigation systems (Laube et al., 2012). Overall, there is an absence of a comprehensive agricultural intervention policy which employs a holistic approach to resolving declining agricultural production. Together, these factors limit farmers' ability to produce enough food to feed themselves, resulting in the rapid increase of the number of youth engaged in ASM as means to ensure household food security.

The need for households to participate in ASM to ameliorate their poverty situation and the cascading effect on youth development issues such as child labor and school dropout in the

study area is important to note. It is evident from the years of ASM engagement that many participants become involved with the sector at very young ages. Irrespective of this, it is important to understand that the pervasiveness of the situation is the result of social norms associated with work. Like many other economic activities including farming, the structure of the economy of ASM in the study area involves the family. The overwhelming support and encouragement provided by family members and community leaders for youth engagement in ASM lends credence to this argument and also help normalize cases where parents and children work together in extracting gold. This overall approach to work is based on cultural norms which tend to view children's participation in work as part of the socialization process (Berlen, 2013; Krauss, 2017). In the case of this study and similar to other research (e.g. Krauss, 2017), the argument is extended to include the need to earn money for household upkeep particularly food needs. Additionally, it concerns how poverty — in addition to pushing many young people into ASM — also results in school dropout or temporary halt in education in favor of ASM engagement. Combined with child labor, interruptions in children's education have the potential of limiting their development as well as their ability to acquire higher level skills which could help them escape the poverty cycle.

7.2.2 Evolving livelihood strategies in the study area

Although agriculture remains the most dominant means of livelihood, the perception among participants that it does not have the ability to reduce poverty and improve their overall wellbeing has resulted in increasing participation in ASM especially among youth. This finding is part of a growing trend in the study area and other parts of sub-Saharan Africa involving livelihood diversification away from agriculture and towards non-farm activities such as ASM (Hilson & Garforth, 2012; Yaro, 2006). ASM and agriculture sometimes co-exist in some rural areas in Ghana even though the former is gaining prominence. Yet, in other cases there is complete de-

agrarianization due to outright abandoning of agriculture. The findings of this research, however, show that households in the study area are involved in a kind of income diversification with their members concurrently engaged in agriculture and ASM. This confirms the study results depicting the link between agricultural production and ASM in the southeast of Ghana conducted by Hilson and Garforth, (2012). It is however important to state that this co-existence between ASM and agriculture in the study communities should be monitored as it may not persist for long due to prevailing social and economic environments which encourage youth to participate in ASM.

The lack of employment opportunities other than mining demonstrated in the findings of this research is a worrying concern and could accelerate the de-agrarianization process. Such observations are especially important within the broader context of development in Ghana as a whole and mining communities in particular. Research shows an increasing trend of underemployment and unemployment among working age Ghanaians (Aryeetey & Baah-Boateng, 2007). Scholars note that most of the employment created within the country in the last couple of decades have been in the mining sector. This corroborates the findings of this study which shows the importance of mining as a livelihood and survival strategy for most people in the study area. The lack of opportunities outside mining emphasized by the findings in this research demonstrate a broader dysfunctional growth in the economy where priority is not placed on higher labor absorption rate sectors such as manufacturing, tourism, improved agriculture and agri-related businesses. Unfortunately, national development policies have reduced investment in these sectors for the benefit of the mining industries where a majority of the new employment opportunities are low-skilled in nature (Aryeetey & Baah-Boateng, 2007).

In the wake of the growing importance of ASM as a means of livelihood, declining employment in agriculture and high poverty incidence in mining communities, government

together with stakeholders (specifically mining companies) have been compelled to experiment with Alternative Livelihood (AL) programs with the hope of reducing unemployment (Hilson & Osei, 2014). These projects are an effort to diversify the economies of rural locations — which are the site of ASM activities — by providing skilled training to youth in areas such as livestock rearing and fish farming among others. In this study, the disinterest showed by the target population for government sponsored skill training programs demonstrate the unrealistic expectations that have been associated with AL projects in other parts of Ghana (Hilson & Banchirigah, 2007). AL projects tend to be agri-based or agri-related which makes them unappealing to the youth thereby minimizing the chances of them abandoning ASM in favor of potential income earning in agriculture in the long term. This is unlikely especially in the context of this study where participants view agriculture as having little potential to reduce poverty.

7.3 Health risk perceptions, environmentally fragile communities and ASM

Health risk perceptions and environmental fragility constitute important conceptual underpinnings in this research. Workplace health and safety risks associated with ASM cannot be overstated and participants demonstrate their knowledge of the risks associated with the sector. Irrespective of this knowledge youth miners perceive their benefits as outweighing the cost of occupational risks. This confirms Corburn (2007) findings that there is often a divergence in local expertise knowledge on environmental and health governance. This behavior is due to the subjective assessment and interpretations of workplace health and safety risks as well as the associated costs (Armah et al., 2016). In the context of this study, the motivations for engaging in ASM serve as a driver for continued engagement in ASM. This indicates the importance of ASM as a survival strategy as participants were willing to accept the risks that come with their work.

Negative environmental impacts of ASM activities are used as a rallying point by sections of the Ghanaian society to persuade government to ban the sector (NewsGhana, 2014; ModernGhana, 2015). Scholars often note that the impact of ASM cuts across the lithosphere, hydrosphere and atmosphere. In Ghana, negative consequences of ASM on the lithosphere and hydrosphere have been the greatest source for concern among many stakeholders because of the visible eye-sore usually created. Miners usually leave behind degraded landscapes and polluted water bodies at the end of the gold extracting process. On the land, ASM often results in deforestation, piles of unstable waste, open trenches and large acres of barren land unusable for other economic activities especially agriculture (Yelpaala & Ali, 2005). Since ASM activities are usually undertaken by individuals working together in a group, ensuring that land reclamation occurs after the cessation of mining is not guaranteed as demonstrated in the findings of this study. Additionally, irrespective of the method of mining employed, ASM usually involves the removal of topsoil. The practice exposes the land to erosion with the least amount of rainfall — making such lands almost incapable of supporting the growth of plants. The long-term implications of this for agricultural livelihoods in the study communities can be dire. This is because agriculture represents a main source of employment in these rural communities despite the growing importance of ASM-related employment. Especially in the context where agriculture has been declining due to climate change (Laube et al., 2012; Tambo, 2016), the devastation caused by ASM to lands for farming could further exacerbate food insecurity in the region.

The destruction usually caused by ASM to vegetation is particularly noteworthy especially in the context of the study communities. With the increasing impact of climate change, the fragility of the scant dry guinea savannah vegetation of the UER and northern Ghana as whole cannot be overstated. Increasing aridity due to gradual reduction in rainfall amounts and persistent annual

bushfires in the area continue to take their toll on the vegetation, rendering communities at the risk of desertification. The perception among some miners that ASM undertaken in distant locations from communities does not impact the environment and thus does not need to be reclaimed is worrying for a couple of reasons. First, due to their disregard for preserving the quality of land, the activities of ASM operators has been noted as a source of conflict with farmers. This is usually the case where gold-rich locations align with farmlands (Kumah, 2006). Mining activities in the study area occur close to water bodies which tend to also have rich alluvial soils suitable for farming. It is therefore not surprising that participants indicate some landowners express dissatisfaction and demanded monetary compensation in instances where land was not reclaimed. Conflicts between ASM operators and farmers could increase in the future because of the marginal nature of land for farming in the study areas. The detached attitude towards the environment by ASM operators could also lead to rapid and systematic land cover change. In many locations in SSA, systematic land cover change due to ASM activities has been associated with habitat and biodiversity loss (Meaza et al., 2017; Mhlongo, & Amponsah-Dacosta, 2016) with negative consequences for non-ASM livelihoods and regional climate. The fragility of the dry guinea savannah vegetation in the area requires some protection to reduce rapid desertification.

One of the most significant impacts of ASM on the environment is the pollution of water resources. Similar to other parts of Ghana, surface water pollution has become synonymous with ASM operations. Armah and colleagues (2013), suggest that central to this problem is the lack of enforcement of mining regulations which is the result of the resources constraints of mandated institutions. This situation has health implications for communities which rely on such water bodies for domestic use. As one of the poorest regions in Ghana, many communities in UER including those in the study area lack various infrastructure including portable water. The reliance

on sachet water currently adopted by community members is a coping strategy. This situation might worsen with increased ASM and the associated water pollution practices persist.

7.4 Limitations, recommendations and directions for future research

My inability to speak the local language of the study area, Guruni, may have limited my ability to speak directly with all the study participants. However, steps were taken to ensure that language barriers did not limit the data collection process and the overall rigor of the research. First, the research team developed a good rapport with community leaders and study participant through conversations about the community. This enabled the research team to build a deep understanding of the community context before the interviews. Second, all interviews and focus group discussions were tape recorded verbatim and transcribed. This ensured the preservation of meanings intended in the various conversations.

Irrespective of the stated limitations, the study findings offer some policy options for government, community leaders, youth miners and other stakeholders. Ghana's development trajectory is clearly stipulated in its Poverty Reduction Strategy Papers (PRSP), another initiative driven by the World Bank and the Shared Growth and Development Agenda (SGDA) prepared by the National Development Planning Commission. The core elements of the PRSP on which the government bases its strategy to ameliorate poverty include stabilization of the total national income, production and employment, human resource development, and special programs for the vulnerable in society. In order to create enough employment avenues for the people, both the PRSP and the GSGDA agree on the need for expansion of various sectors. As recorded in the recent GSGDA (II), one of the thematic areas of the government's medium- term development plan is an accelerated agricultural modernization and sustainable natural resource management. The focus is to build the foundation for an efficient-driven economy anchored on the conversion of Ghana's

natural resources into value-added products, agro-based manufacturing, down-stream oil and gas and minerals processing and manufacturing (NDPC, 2014). As a key policy intervention for a faster transformation of the agricultural sector, government continues to insist on exploiting opportunities in the sector for accelerated job creation.

Meanwhile, the Government of Ghana and other African countries has signed unto the overly ambitious African Mining Vision which outlines the relevance of the mining sector towards sustainable growth and socio-economic development. Highlighted as a component of the Vision, African governments agree to "a mining sector that harness the potential of ASM to stimulate local or national entrepreneurship, improve livelihoods and advance integrated rural social and economic development" (African Union, 2009; pg. v). It however intends to achieve this in a very sustainable way not only through the development and innovation of appropriate technology; but also, an inadequate framework for technology diffusion and assimilation (African Union, 2009). Ghana, however, does not provide a clear-cut position of the mining sector, especially ASM in its development document. This confirms the report in the African Mining Vision that the ASM sector is widely neglected locally (and in the international development agenda) as it does not feature in most national and local poverty alleviation strategies. It is also evident from this study that alternative livelihood opportunities outside of agriculture and ASM are limited in the research area. Thus, policies which promote income generating opportunities outside of these two sectors should there be exploited. Although the GSGDA II stipulates private sector development as a key component of the government agenda, it is also recorded that doing business in Ghana in general remains uncompetitive. The policy options suggested here for the new opportunities should create an enabling environment which supports the establishment and growth of small businesses and promote self-employment. This will absorb the excess labor from the farm and redirect them away

from ASM. A workable policy option should include access to financial capital for individuals and households as this has been demonstrated to improve non-farm work, reduce poverty and improve food security (Owusu, Abdulai, & Abdul-Rahman, 2011; Zereyesus, et al., 2017). These policy options for improving youth economic activities in the informal sector must have gender considerations due to the gendered nature of economic activities in the study area.

There is also the need to re-examine government and stakeholder employment intervention programs. The disinterest in government employment intervention programs such as basket weaving training and other agri-related business training programs suggests the lack of understanding of the needs of youth in the area. Agriculture-related AL programs are generally met with disapproval and disinterest in locations where these programs have been implemented (Hilson & Garforth, 2012). To change the situation, government and other stakeholders interested in youth employment should employ a participatory approach which incorporates the opinions and interests of youth in designing employment training programs. Involving youth and giving them a sense of ownership of alternative livelihood intervention programs would provide a sense of program ownership, improve interest and increase participation.

Due to the endemic nature of poverty in the area and the general underdevelopment evidenced by lack of basic infrastructure such as roads, health facilities and portable water, a comprehensive development policy which simultaneously takes all these challenges into account is needed to make a positive impact. Such policy efforts must prioritize improving youth educational attainment with the ultimate aim of developing their skills to take up opportunities in outside of agriculture, ASM and other informal economic activities.

Future research on youth engagement in ASM should employ the use of other methods to explore dimensions not covered in this study. For example, a future qualitative study can employ

the use of photovoice to examine the work environment of ASM operators to better understand occupational health risks. Such an approach will enrich findings since ASM operators will be able to provide pictures of places such as underground tunnels which are usually out of the reach of researchers. Photovoice would also be useful for adopting a community based participatory approach which will allow community members (ASM participants and non-ASM participants) to interact about their environment. This approach may be useful for effecting behavioral change and designing environmental intervention strategies by exposing community members to environmental challenges associated with ASM. This may result in community-based sustainable ASM practices which are acceptable to ASM participants and non-participants alike.

In addition, a future research initiative that employs a quantitative design would be useful for understanding how contextual factors (e.g. household poverty, parental background, etc.) and individual sociodemographic factors are associated with youth participation in ASM. This will enable the inclusion of a larger number of participants and improve generalizability of research findings.

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APPENDICES

Appendix A: Letter of Ethics Approval

Western Research

Research Ethics

Western University Health Science Research Ethics Board
NMREB Full Board Initial Approval Notice

Principal Investigator: Dr. Isaac Luginaah
Department & Institution: Social Science\Geography,Western University

NMREB File Number: 106305
Study Title: Poverty, unemployment and youth in mining communities in Ghana
Sponsor:

NMREB Initial Approval Date: April 28, 2015
NMREB Expiry Date: April 28, 2016

Documents Approved and/or Received for Information:

Document Name	Comments	Version Date
Other	Interview guide - miners	2015/01/27
Revised Western University Protocol	Revised REB protocol - cleaned	2015/04/09
Letter of Information & Consent	LOI - Informants	2015/04/09
Letter of Information & Consent	LOI - young miners	2015/04/09
Letter of Information & Consent	LOI - parent	2015/04/08
Instruments	Interview Checklist - Key Informants	2015/04/09

The Western University Non-Medical Research Ethics Board (NMREB) has reviewed and approved the above named study, as of the NMREB Initial Approval Date noted above.

NMREB approval for this study remains valid until the NMREB Expiry Date noted above, conditional to timely submission and acceptance of NMREB Continuing Ethics Review.

The Western University NMREB operates in compliance with the Tri-Council Policy Statement Ethical Conduct for Research Involving Humans (TCPS2), the Ontario Personal Health Information Protection Act (PHIPA, 2004), and the applicable laws and regulations of Ontario.

Members of the NMREB who are named as Investigators in research studies do not participate in discussions related to, nor vote on such studies when they are presented to the REB.

The NMREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000941.

[redacted], NMREB Chair

Ethics Officer to Contact for Further Information

Erika Basile	Grace Kelly	Mina Mekhail	Vikki Tran

This is an official document. Please retain the original in your files.

[redacted] www.uwo.ca/research/ethics

Appendix B: Informed Consent for In-depth Interview: Key Informants

Invitation to participate in In-depth Interview

I am Lydia Osei, a PhD student under the supervision of Professor Isaac Luginaah of the Department of Geography at the University of Western Ontario in Canada. I am currently conducting a study on 'poverty, unemployment and youth in artisanal small-scale mining in the Upper East Region of Ghana' and would like to invite you to participate in this study. The purpose of the study is to investigate young people's motivation to participate in artisanal small scale mining as a livelihood strategy and their perceptions of the health risks associated with such activity. It further seeks to assess how increased artisanal mining activities produce or perpetuates a contention between the mining sector and agricultural sector more specifically for young peoples' labor. I would like to invite you as a Key Informant/Community Leader/Government Officer to participate in the study as it would assist in my understanding of the reasons for the spate in numbers of youth in artisanal mining and how the community at large perceives this in relation to the environmental effects and perhaps economic and/or social benefits to be accrued from such activities.

If you agree to participate in the study you will be asked to answer some questions. These questions concerns livelihoods strategies available to the youth; particularly information on the role of artisanal small-scale mining to the community, perception on short and long term repercussions of the sector, and the interventions made by government and/or the community in tackling an increase in artisanal small-scale mining activities. Personal information will be gathered and recorded in this interview, and will further be used in the results analysis or publications; however actual full names will be altered during the analysis. The interview should take approximately 1 hour to finish. There are no other known risks associated with your participation in this study apart from uneasiness related to discussing your socioeconomic, cultural or political status. All interviews will be audio recorded but participant can opt not to be recorded.

The information collected will be used solely for the purposes of this study. All information collected for the study will be kept confidential. Information transferred onto laptops, university desktops will be password protected, and will be destroyed five years after completion of the study. We will make all efforts to maintain anonymity.

Your participation is completely voluntary and you may refuse to participate, answer any questions or withdraw from the study at any time. There is no penalty for withdrawing or not answering any

questions. Answering these questions means that you have agreed to participate in the interview. You may keep a copy of this information sheet.

If you have any questions about the conduct of this study or your rights as a research participant you may contact the Manager, Office and Research Ethics, The University of Western Ontario or the researchers of this study.

I have read the Letter of Information, have had the nature of study explained to me, and all questions have been answered to my satisfaction and I agree to participate.

Participant Name _____

Participant Signature_____

Date_____

Investigator's Signature_____

Date_____

Appendix C: Informed Consent for In-depth Interview: Young artisanal small-scale miners

Invitation to Participate in In-depth Interview/Focus Group Discussions

I am Lydia Osei, a PhD student under the supervision of Professor Isaac Luginaah of the Department of Geography at the Western University, Canada. I am currently conducting a study on 'poverty, unemployment and youth in artisanal small-scale mining in the Upper East Region of Ghana' and would like to invite you to participate in this study. The purpose of the study is to investigate young people's motivation for engaging in artisanal small scale mining as a livelihood strategy, how they manage the political system within which they operate (formation of identities) whilst they create a livelihood trajectory; and their perceptions of the health risks associated with such activity. It further seeks to assess how your engagement in mining produces or perpetuates a contention between the mining sector and agricultural sector, more specifically, for young peoples' labor. I would like to invite you as a Key Respondent (Young Miner) in the Upper East to participate in the study as it would assist in my understanding of the reasons for the spate in numbers of youth in artisanal mining and how these young miners negotiate for 'place' in society; the community's perception of their activities in relation to the environment and perhaps economic and/or social benefits to be accrued from such activities.

If you agree to participate in the study you will be asked to answer some questions. These questions concern livelihoods strategies available to the youth; particularly information on your motivation to engage in artisanal mining; the importance of this to yourself (and any other persons) and your concern on occupational health. Personal information will be gathered and recorded in this interview, and will further be used in the results, analysis or publications; however only first names will be used during the analysis to maintain anonymity. The interview should take approximately 1 hour to finish and another hour for the focus group discussion. There are no other known risks associated with your participation in this study apart from uneasiness related to discussing your engagement in artisanal mining.

The information collected will be used solely for the purposes of this study. All information collected for the study will be kept confidential. Information transferred onto laptops, university desktop will be password protected, and will be destroyed five years after completion of the study. We will make all efforts to maintain anonymity.

Your participation is completely voluntary and you may refuse to participate, answer any questions or withdraw from the study at any time. There is no penalty for withdrawing or not answering any questions. You may keep a copy of this information sheet.

If you have any questions about the conduct of this study or your rights as a research participant you may contact the Manager, Office and Research Ethics, The University of Western Ontario or the researchers of this study.

I have read the Letter of Information, have had the nature of study explained to me, and all questions have been answered to my satisfaction and I agree to participate.

Participant Name _____

Participant Signature_____

Date_____

Investigator's Signature_____

Date_____

Appendix D: Semi-structured interview and FGD guide (youth miners)

Young peoples' motivation into artisanal small-scale mining

Explain to me your motivation for engaging in artisanal small-scale mining?

Are you a resident or migrant? If the latter, why do you choose to mine here?

What are the other economic activities available to you?

Explain to me your responsibilities within your family and any other expectations the family may have for you.

What are your future goals, more especially, in relation to employment?

Do you consider artisanal mining a viable venture?

Artisanal mining and agricultural sector

What is your perception on agriculture as an economic activity?

Explain to me the processes involved in acquiring land both for mining and agriculture

What, in your opinion, are other challenges that the agricultural sector faces?

Between agriculture and artisanal mining, which has a future?

Which of the sectors do you prefer and why?

Youth identities in mining community

What do you think is the community's perception on your activities?

Explain to me the process involved in starting up artisanal small-scale mining?

How are you able to raise capital for this?

What is the relationship between you and local leaders?

Occupational Health perceptions

Can you think of any health-related complications from your activities?

Would you consider your work as a highly risky one?

Do you think the risks of this activity outweigh the benefit or vice-versa for you?

Explain how you manage occupational health complications

In your opinion, do your activities pose any health problems to the community?

Appendix E: In-depth interview checklist (key informants)

Youth motivation into artisanal small-scale mining

Can you recount to me the history behind artisanal mining in this community?

Overall, what is your opinion on the ASM sector?

In your opinion, what are the factors that motivate youth to engage in artisanal small-scale mining?

What are the economic opportunities available for youth in this community?

As a member of this community, what are your expectations for the youth (especially those who are out-of-school)?

How often do you find young people looking for jobs at the mining camps?

What are some of the socio-economic challenges in this community?

Do you think ASM has a future in this community?

Artisanal mining and agricultural sector

What is your perception on agriculture as a viable economic activity for youth?

In your opinion what are some of the challenges the agriculture sector faces?

Would you consider these challenges as reasons for youth engagement in artisanal mining?

Between agriculture and artisanal mining, which has a future?

Which of the sectors do you consider relevant to the development of the community?

Youth identities in mining community

As a community leader, what are your overall perceptions on artisanal mining?

What is the relationship between you and the youth miners in this community?

Do you consider yourself responsible for the youth in this community?

What are your plans regarding youth employment?

Perceptions on Occupational Health and the Environment

Would you consider artisanal mining a highly risky work? and if so, how do you relate that to the socio-economic benefits?

Can you tell me the health assistance available to the community and if any specific help is offered to miners?

How do miners generally respond to health complications from their activities?

Explain to me the mining related programs to educate youth on health complications related to their work

In your opinion, do ASM activities pose any environmental problems to the community?

Is there anything to be done to mitigate problems associated with ASM?

CURRICULUM VITAE

Name: **Lydia Osei**

Education

University of Western Ontario
London, Ontario, Canada
2013 – 2017 PhD Geography

University of Reading
Reading, Berkshire, UK
2011 – 2012 MSc Applied Development Studies

University of Ghana
Accra, Ghana
2003 – 2007 Bachelor of Arts (Honours)

Honors and Awards:

Canadian Association of Geographers (CAG) Membership Award
2016 - 2017

Queen Elizabeth II Diamond Jubilee Scholarship (QEIIDJ)
2015

Western Graduate Research Scholarship (WGRS)
2013-2017

Diageo Scholarships
2011-2012

Related Work Experience: Course Instructor – Geography of sub-Saharan Africa.

University of Western Ontario. Limited duties instructional appointment

2017

Graduate Teaching Assistant
University of Western Ontario
2013 – 2017

Publications

Kangmennang, J., **Osei, L**., Ato-Armah, F., and Luginaah, I. (2016). "Genetically modified organisms and the age of (unreason)? A critical examination of the rhetoric in the GMO public policy debates in Ghana. *Futures* doi:10.1016/j.futures.2016.03.002

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